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COMPUTER WEEKLY

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COMPUTERVIEW

TAX changes contained in the Finance Bill would remove the fiscal penalties falling on public companies when they float off subsidiaries as autonomous quoted companies, and if the Bill goes through, GEC is quoted to take advantage of the new freedom.

In corporate affairs, small is decidedly beautiful — or at least fashionable — but while there is evidence for the beneficial effects on employment of a thriving small business sector, the case for, say, GEC Computers operating more successfully apart from the rest of the group is unproven.

Clearly there are benefits in giving talented managers their heads, and allowing them to make their own decisions without having to refer constantly to some omniscient corporate plan.

But are there enough talented managers to go round? Shareholders have in the recent past been notoriously simple when it comes to giving poorly performing managers the boot.

"Demerging" is the ugly name given to the spontaneous spawning of autonomous companies. Clearly where top management in a large corporation is inadequate or has lost control of the various subsidiaries, demerging them has a fighting chance of being a successful operation. Since one of the aims of any company is growth, one result of successful demergers will be a string of large companies in a decade or so.

That implies that the sum of the demerged GEC companies would, in a few years time, be considerably greater than if they remained part of the GEC empire.

The urge to demerge

There is a striking model for this in the US. The international operations of telephone giant AT&T were hived off into a separate company in the 1920s under a US government anti-trust settlement. Those international operations today embrace such diverse business interests as the Abbey Life Insurance company, Amplex and Shirley dog products, Quine printers, Standard Telephones and Cables in the UK and Standard Elektrik Lorenz in West Germany. The company as a whole is the megahit ITT.

One hardly expects GEC Computers to go the same way, but perhaps the company would become better known if it were outside the present GEC conglomerate. Of course, the reason for breaking up AT&T, and for the proposed break-up of IBM, is not that the result would be better efficiency and performance, but in their existing forms they were too successful.

It is unlikely that IBM's Data Processing, General Systems and Office Products Divisions would be any less successful if run as separate companies, and they would arguably be even more successful than they are now.

But despite the multitude of difficulties into which it has run itself in the past two years, IBM can hardly be said to be unsuccessful in its present form.

When one considers whether demerging is intrinsically necessary to improve the performance of Britain's slumbering giants, the example of Rocal yet again springs to mind, and seems to offer an attractive half-way house.

Rocal is now a large company, yet throughout its history it has consisted of a collection of small companies under a strong and extremely well-informed central management. Most Rocal companies exhibit all the risk-taking, imaginative entrepreneurial characteristics attributed to small companies, but benefit from the corporate image by the sense of belonging to a larger and very successful group.

Much of this would be lost if Rocal were to start demerging, and while the stock market might well value the parts of Rocal higher than it values the whole, it is difficult to envisage any other advantages.

When it comes to ICL, it is hard to see any benefits in a demerger — not that the company has suggested that it is thinking of any such thing. The research and development resources needed for success on the world computer market are so enormous that only a large company can command them.

In the case of GEC, and perhaps of floundering giants like British Leyland, demerging may be beneficial, but it hardly looks like the panacea for the problems of Britain's large companies as a whole.

LETTERS to the EDITOR

White-collar mercenaries who serve apartheid

AS a South African who has been out of his job as a journalist by the South African Security Police, and eventually forced to leave his country, I was incensed to read the letter by Don Gray of Johannesburg (CW, February 7). Gray describes himself as "an expatriate" who has "lived 20 years in South Africa".

After implying that critics of South Africa are ignorant of the situation because they may not have visited the country, Gray states: "Our country is coming right. We are trying hard to improve the lot of everyone. Come and join us... and help us."

If white South Africans were in any way serious about "improving the lot of everyone" they could start by giving the vote to the 80% of the population — Africans, "coloured" (mixed race) people and those of Asian descent — who are not represented in Parliament.

Houses in black townships could be provided with running water and electricity. The barbed wire fences that seal off these townships could be pulled down.

The Pass Laws could be abolished. These laws create a network of "technical" offences which control the movements of Africans, who form 70% of the population. Under these laws 224,308 Africans were arrested in 1977, according to the South African government's own figures.

Thousands arrested under the Pass Laws are "released" under what is called "parole" by the SA Prisons Department. These "paroled" are sent as "contract labourers" to private farms to work under notoriously brutal conditions. Attempts to take photographs, or write about what one has seen, or even tell anyone, render one liable to prosecution under the Prisons Act. Worse, one brings oneself to the attention of the Security Police.

Figures relating to Africans "released on parole" are no longer given in the Prisons Department's annual report, and the Minister of Prisons, J. Kruger, recently refused to give information on the subject when questioned in Parliament.

It is not clear from the report whether the figures were "not readily available". However, some idea was given by the Minister a few years ago, when he said in Parliament that 37,642 prisoners were hired out in this way during 1975.

Another suggestion for people to consider in their efforts to improve the lot of everyone in South Africa: how about ending the migrant labour system?

The system is based on the "homelands" like Bophuthatswana. For whites with money to burn these "independent countries" may offer cash as like Sun City. For the majority of their "citizens", however, they are rural slums, reservoirs of indigent, black, work-seekers, forced by starvation to seek any wage they can get in the cities.

In the cities, African men and women become "statutory bachelors" and spinsters, whether they are married or not, for years at a time. They are housed in single quarters and "bachelor hostels" where no members of the opposite sex they are entertained in rooms and where no children are allowed. African mothers, as a South African government official put it "must send their children back to the homelands" — the law.

London E3  
ALLEN COOK

1984 and all that...

CONTRIBUTIONS from readers are welcome for our column of the strange things people say in the media about computers. We will pay 50p for each item we publish.

Article of Reverend School have entered the micro-biz age in style. The machine cost £700 and can store vast amounts of information, answer complicated mathematical problems and even play a game of chess. Mr. Hutchinson explained: "It is quite fantastic, capable of teaching any subject. It has 32,000 moves, so the data that can be stored is almost limitless."

Borghamwood, Elstree, Edgware Post

GOVERNMENT COMPUTER REQUIREMENTS

MINISTRY OF DEFENCE  
ROYAL AIRCRAFT ESTABLISHMENT (RAE)  
FARNBOROUGH, HANTS  
RG14 5DT

Reference to the Ministry of Defence System Assessment Dept. of RAE, Farnborough, for details of the requirements for the Royal Air Force (RAF) and the Royal Naval Air Force (RNAS) is invited. The requirements are for a system to be used for the assessment of the performance of aircraft and other systems. The system should be able to handle a large volume of data and to produce a comprehensive report on the performance of the system. The system should be able to handle a large volume of data and to produce a comprehensive report on the performance of the system. The system should be able to handle a large volume of data and to produce a comprehensive report on the performance of the system.

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WP price cuts

YOUR story about price cuts on IBM System 8 word processors (CW, April 10) rather surprised me in its description of the product as "unsuccessful".

We are one of the largest users of this equipment in the UK, and as yet there is still nothing in the same league in pure word processing capacity (if you want to do the accounts on the same machine then you do not need a word processor).

What IBM may or may not have up its sleeve is always an interesting question, but recent enhancements in addition to the number of machines already installed make the System 8 look anything but unsuccessful.

Could it be this very success which enables IBM to reduce the price?

R. BATEMAN  
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TRW, Fujitsu sell Japanese systems

THE joint venture between TRW and Fujitsu in the US plans to market the Japanese MIXO-F series mainframes with the Fujitsu OSIV/F2 operating system and one of the prime targets will be Singer System Ten users who get maintenance support from TRW. System Ten users in the US only become ICL customers when they buy a new machine, since ICL did not buy the US operations of Singer.

"We have no detailed plan to market the M-F machines yet," president of TRW-Fujitsu J. S. Webb told Computer Weekly.

OSIV/F2 is similar to IBM's DOS/VS, but by no means fully compatible, unlike the bigger OSIV/F4 which is claimed to be 99% compatible with IBM's MVS.

How does the new company plan to get over this problem? "IBM users will not necessarily be our principal target," said Webb. "It will be difficult to introduce a new mainframe to the market without any existing base, but nothing in this business is easy. Our main selling points will be price, performance, service, and above all reliability."

The new company has taken about 450 people, with 100 on software; the majority have transferred from TRW. At present the software people are working mainly on packages for the V-830 computer, a minicomputer which TRW-Fujitsu will offer as both a business system and terminal controller in competition with such machines as the IBM Series 1, DEC PDP-11 and Hewlett-Packard, 3000 series.

Fujitsu has 51% of the joint venture, the minimum holding to allow it to offset start-up costs against Japanese tax. The company will begin selling banking, automatic teller and point-of-sale terminals immediately, with the V-830 following at the end of the year. It will not impact Fujitsu's existing agreements with Amdahl on large mainframes or Memorex on peripherals.

The Fujitsu acquisition of the word processing side of DPF Leasing in New York promises to be a major element of the Japanese company's thrust into the US market, putting it into close contact with large-scale IBM users.

French connection  
FRANCE is preparing a challenge for a substantial share of the world market for internationally accessible databases. Dilel, the French government body which oversees the national computer industry, has FF 20 million (£2 million) to distribute this year in the form of "growth contracts" to people planning to implement databases which would have a market potential outside as well as within France.

Motorola profits up  
FIRST quarter net profits are reported by Motorola to have increased from \$38 million for the same period a year ago, to \$42 million. Turnover for the same period is up 23% from \$813 million to \$754 million.

DAP arrives  
ICL has finally delivered to Queen Mary College in London the Distributed Array Processor that was originally scheduled to be installed a year ago. The college's DAP is the first version with a 64 x 64 array of processing elements and will be attached to an ICL 2980 already installed. The second DAP customer is the British National Oil Corp.

EMI phoenix  
EMI's technical success with its computer-based X-ray scanners has ended in sad failure — but a small phoenix is preparing to rise from the ashes. A company, Meditex Engineering, formed by former EMI designers, is preparing to market a new scanner.

Teletext export  
LOGICA has sold a teletext system to Austrian television. The system is the TX3, the largest of LOGICA's range, and comprises three digital equipment: PDP-11/34s, a console BBC/Logica, and a software.

Top-end line launched by Philips  
LINING up against the IBM System 36, ICL M28, Univac System 30, Honeywell DPM 4 and Burroughs 51600, a new top-end computer line, the P4000 has been launched by Philips. Built around a 32 megabit per second bus, the P4000 adapts the distributed architecture now standard in this sector of the market, using a version of the AMD 2801 bit-slice microprocessor as the base of the CPU, and Intel 8085 and Signetics FAST microprocessors as peripheral processors.

The 4800 series provides full compatibility with Philips P400 series, running the same DOS operating system and featuring the same instruction set as the P450 and P480 machines. A second, interactive, operating system, Dinos, is also offered, and the P4800 line features several new software modules including a data dictionary, a report writer and a database system.

Memory extends from 256K bytes to one megabyte and communications protocols supported include IBM 2780/2740, the Siemens binary-coded decimal (BCD) and Univac Unibus, and X21 for the way for data transfer.

Languages offered on the P4800 include Cobol and SPL, which is a proprietary system programming language. Pascal is under development.

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Six garages in UK experiment in electronic payment at point of sale

THE pilot project in Electronic Funds Transfer planned by Barclaycard has now gone into operation in the Norwich area, where six garages have equipment to allow customers to pay for petrol by direct deduction from the Barclaycard current or Barclaycard accounts.

Five major all companies are co-operating in the experiment (CW, February 7) which is known as Counterspend.

Barclaycard has provided printers to produce the equivalent of a Barclaycard voucher, and readers for sending the account numbers stored on the magnetic stripe on the back either of Barclaycard automatic teller cards or Barclaycard credit cards.

The equipment works offline: it stores transaction data during the day internally, and is polled at night by Barclaycard central computer, which then carries out the debiting automatically.

Electronic Gilbarco petrol pumps are used, but as yet the sale total is not transferred from these to the cash register automatically; the attendant records the total in the normal way. A voucher is then printed showing the total and the account number from the plastic card. The customer signs this slip, and the attendant checks this against the signature on the card. Thus the transaction is not substantially faster than hitherto, but control keyboarding is much reduced.

The experiment is mainly to establish the customer acceptability of the form of EFT. The equipment includes a Digital Equipment LSI 11/03 processor, with software supplied by Ferronics.

UCL and GEC in talks on robotics link-up  
UNIVERSITY College London has officially unveiled its multi-million replacement for an IBM 360 while discussing with its new supplier, GEC, the idea of carrying out more co-operative projects on robotics. Lord Nelson of Stafford, GEC chairman, made the suggestion at the opening ceremony for the new system of three 4082s.

Sir James Lighthill, Provost of UCL, responded enthusiastically to Lord Nelson's words, adding further applications of optical fibres and acoustic microscopes as possible areas of future co-operative work. The robotics research would be directed towards specific industrial applications in, for instance, assembly, steering clear of the more theoretical side of Artificial Intelligence.

"The general-purpose robot that can operate in any environment is still a mirage," he said. Lighthill was the author in 1973 of the controversial report which cast doubt on the potential of AI and the usefulness of further public funding for it.

UCL's new computer system is to have a fourth 4082 added in the summer. Also yet to become fully operational is a Cae DCX multiplexing system that will switch users either to UCL's own machines or to any of the other academic networks such as those at Imperial College or London University.

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## Downtime

by Chad

## Mind-stretching experience

HANOVER FAIR is ridiculous. What's the point of a show where you have to equip a major expedition to get from one end of the grounds to the other? To say nothing of the native porters you need to carry around the huge catalogue and all the lumpy you collect.

Still, it's good occasionally to get one's mind (and one's biceps) stretched. There are nice touches of ingenuity, such as the mode of transport by which one arrives to see all the space-age technology, namely, trains.

Soon, if your calculator is one-deal you won't have the face to produce it at a board meeting, judging from the racks of the things all wurling away. I thought I was in the Regent's Park aviary. Is this the peak of capitalist technological achievements?

Apparently so. Among the range of electronic cash registers, the most ingenious had to be the one on the Electronic Business Machines stand, which had a moulded plastic case made to look like one of those old ornate brass jobs. They couldn't do much about making the LED display look old, though. Who on earth would want one, I asked. Oh, antique shops, boutiques, said the lady.

The most advanced computer technology was to be found in the Research Hall. The European Space Agency had a mock-up of the laboratory to be sent up in the Space Shuttle, and there among all the equipment what



THE Germans have not yet got into as much whimsy as you find at American fairs, but they are working on it. Take for instance the systems house which exhibited these computer-driven gorillas, moths and daughter. What it was all about I have no idea, since although mother and daughter had a long conversation, it was all in German. Their calculations were quite impressive, I have to admit.

## Sharp's the word

YOU will have noticed that every computer company under the sun is hurriedly joining the OOF Stakes — the race to produce the all-electronic Office Of the Future. The other day a firm, whose name I will withhold to spare its blushes, launched a new organisation to market business systems — and what do you suppose it gave away to the assembled journalists, its symbol for the paperless Office of the Future — electric pencil sharpeners.

By this I do not mean sharpeners for electric pencils. Mind you in my cynical way, I keep saying we're never going to get rid of pencils, so maybe those people have been listening to me.

Meanwhile the electric pencil sharpener has been received warmly on CW's sub-editor's desk, where somewhat to our embarrassment we write about this new world while obviously using the most antiquated technology imaginable.

The day after the sharp-



## MICHELIE'S PRIVATEVIEW

## Home truths on our ailing industrial technology



Professor Donald Michie is head of the Machine Intelligence Research Unit at Edinburgh University.

IN a succession of reports, the Cabinet Office's Advisory Council for Applied Research and Development has fired a remarkable salvo of home truths concerning the UK's ailing industrial technology.

ACARD has now done it again: this time not so much responding to the need for renovations as to the opportunity boldly to strike out along a fresh line.

The new ground is genetic engineering, fast becoming a high growth industry in the US. By combining forces with the Advisory Board for the Research Council and the Royal Society, ACARD has also ensured that something is likely actually to get done.

A sum of £10 million over five years is proposed for launching an NEI-backed company. Facilities in universities are to receive £2 million from the University Grants Committee and a minimum of £3 million a year committed by the research councils.

Anticipated pay-offs upon the entire field of biochemical manufacture, including new vaccines, anti-cancer agents, animal feedstuffs, means of combating pollution and recycling waste, and other advances.

A policy of government-aided "technology push" will gradually be overtaken by "market pull" as biotechnology emerges from the research-dominated pre-development phase into commercially profitable operation.

Even in these stricken times it appears that our government can still get a new technology moving when it wants to. So why in one case, and not in another?

Everyone knows that there is at least one other conspicuous "hot spot" in our applied science landscape. It is no secret that the UK's highest and most consistent rates of growth are in the computing services industry.

The situation here is now poised to go either way — given the right seeding of R & D investment, to dazzling successes.

Otherwise, as a report from Business Industrial Monograph warns, "developments in other countries will overtake the United Kingdom and the opportunity of establishing a strong competitive industry will have been lost."

Everyone has his own list of sectors ready to yield to determined thrust. Mine are the following:

- Parallel array processing, with special reference to computer vision, exemplified in ICL's DAP and Michael Duff's CLIP-4, now operational at University College London. These new architectures promise breathtaking speed-ups and, even more important, radical conceptual simplifications of complex domains. Applications of cheap reliable computer vision range from optical inspection of industrial parts and structures to the input and interpretation of diagrams from books and documents.

- Automatic program synthesis. Energetic advances here are a necessity if the industry is not to have its back broken by continued escalation of program costs. Ripeness of time has

been adequately guaranteed by preliminary successes. He who hesitates is lost.

- Expert Systems. The country which first establishes an edge in interactive knowledge bases will be in a fair way to call the shots across the board. Knowledge engineering is like genetic engineering: the principles are relatively simple, the range of applications unlimited. International leadership is still up for grabs.

The UK is currently in possession of the only cheap and portable general-purpose software for such work. But, without the needed follow-up, the balance of opportunity could quickly change.

- Intelligent robots. It seems a feasible proposition to use an expert system to drive an industrial robot, conferring versatility, retrainability and autonomous resourcefulness beyond anything yet seen in automation. Potential relevance to manufacturing technology is obvious. After last year's robotics initiative by the Science Research Council, there could not be a better moment.

How should all this be facilitated? Writing in the magazine New Scientist, George Gallagher-Daggett, an engineer of SRC's Rutherford

Laboratory, has called for "centres of innovation." These would "allow university researchers to join multi-disciplinary teams, involving industry and possibly private inventors as well, without upsetting their promotional prospects. In this environment they would be subject to the stimulus of commercial competition and could devote their efforts to commercialising intellectual concepts arising from fundamental research carried out in universities."

Brave words: Something along these lines could undoubtedly flip the switch to the "on" position. This is, however, not the first time that such proposals have been advanced; ingrained patterns of thought among government administrators must change if they are to time to find fertile soil.

The significance of the news from the biotechnology front is precisely that such patterns do seem at last to be changing. The next year or two may be crucial in showing whether venturesome stirrings are to be allowed to spread.

Donald Michie

## Strong pound hits ICL's profits plan

A HICCUP in pre-tax profit growth was the only significant setback in another set of strong first-half figures from ICL. Turnover growth remained on target at 21%, but pre-tax profit rose only 10%. The relative decline is attributed primarily to squeezed margins in ICL's overseas subsidiaries because of the relative rise in the value of sterling.

A favourable tax position put after-tax profits up 28% at £16.3 million, but ICL has charged the full estimated cost of the Dukinfield feeder plant closure to profits in the half, reducing this figure by £7.7 million to £8.6 million.

Half-year turnover of £348.3 million keeps the company on target for full year turnover of about £780 million and pre-tax profits, usually better in the second half, of about £52 million.

Because of the rise in sterling's value against most foreign currencies, ICL's foreign business is declining as a proportion of the total, and is now down to

42%-43% of the total compared with 50% 18 months ago.

● The House of Commons Public Accounts Committee has realised that the terms of the £40 million government loan contributed to the development of ICL's 2900 series made it certain that ICL would never have to

repay more than a small fraction of the sum. The committee still hopes that ICL will make a repayment in 1983-84, the final year in which it is required to do so. Repayments only have to be made when pre-tax profits exceed 7.5% of turnover, in a maximum of 25% of the pre-tax figure.

## Jacquard cuts back UK sales operations

TWO UK offices have been closed and 18 sales staff sacked by AM Jacquard, maker of combined word and data processing equipment. The company says direct sales business has been lower than planned and the cut-backs are to bring staffing levels into line with this. Sales via distributors have been "on target" though.

The whole direct sales operation in West Germany has also been closed, while the more profitable one in France is unchanged. The UK company has been left with offices in London and Birmingham, losing Manchester and Southampton.

The decision emanated from corporate headquarters in Santa Monica, California. The company was bought only 18 months ago by AM International, formerly Addressograph-Multigraph.

The cuts come only three weeks after Jacquard introduced the AMtext 425 word processor into the UK. This is a stand-alone machine aimed at printers and the in-house reprographics market, and was going to be sold entirely through direct sales. However, the marketing manager for the 425, Jeff Yelpe, is one of those sacked. He is intending to set up his own firm to sell the machine.

Those made redundant are all sales or software support staff. In the company's view this should not affect existing customers. Prior to the arrival of the 425, Jacquard had two products,

both combined word and data processors, one shared-logic, the other stand-alone.

The 425 has a full-page screen and facilities for converting text for typesetting, without rekeyboarding. The text is taken from the 425 on a floppy disc and loaded into an AM phototypesetter. The word processor can also handle parallel columns of text, as well as figures.

## New products scarce at WP show

A SCARCITY of new products, and attendance hardly increased over 1979, were dominant features of the International Word Processing Exhibition at Wembley. Attendance at the accompanying conference was also low, but some exhibitors said that the seriousness and importance of the visitors was an improvement on past shows.

A stand-alone word processor called Omega was introduced by Computec, the Californian maker of small business systems. DP applications software can be swapped in when desired, and a full-page screen is an option.

A plustable stand-alone called the FD-88 was launched by Supertyping as a replacement for its FD-85. The basic language can be loaded for DP work, and hard cartridge discs are available.

UK users had their first glimpse of the Gys electronic typewriter, along with Vydcon on the Exon Enterprise stand, and the Multiplex, the AES shared-logic system (CW, November 8, 1979).

## Eire goes for US software houses

THE US software supplier Turnkey Systems Inc is to set up a software development operation in Dublin following an agreement with the Industrial Development Authority of Eire. This is part of the IDA's thrust into software.

TSI is a wholly owned subsidiary of National CSS of Connecticut and is best known for the telecommunications monitor Task/Master. The product will be marketed and enhanced from the Dublin centre, which will provide 70 jobs. The company has also set up in France and West Germany.

Another US company to establish an Irish base under the IDA's favourable tax concessions is Apple Computers, which plans to manufacture Apple II and III systems and peripherals at a plant in Cork. Apple's plans mean 150 jobs by Christmas followed by another 1,400 later.

Intel is also reported to be looking at Eire, and the chances of its setting up a plant there are "more than likely".

"We are now making a thrust into the software industry," said Jerry Kelly, manager of the IDA's service division.

"As a people-intensive business it will benefit from the large supply of graduates — there are 19,000 student places for electronics and computer sciences planned for the next five years." He added "It is also a capital-intensive business, and the freedom from tax will allow 100% of earnings to be ploughed back into development."

## DG results

SECOND quarter figures for March 15 for Data General show net profit up about 4% at \$12.7 million on turnover up 30% at \$146.7 million. Profits continue to be depressed by the cost of expanding the services network, which reported business up 60% at \$23.5 million.

## German turnover

WITH turnover up only 4.1% to DM 6,993 million (£1,885 million) IBM Germany has now reported that profit on this was down 23% on 1978 at DM 448 million (£112 million). Disposal of share investments to finance capital spending contributed to the profit fall.

## FOCUS

A TOP men from IBM's Office, Products Division, Samuel Karlow, advised DP managers to get to grips with word processing technology. Speaking at an ARIPS office automation conference held in Atlanta, Georgia, attended by about 10,000 delegates — he warned that a clear understanding of WP, what it is and what it does, was essential for the DPM if he or she is to cope with the introduction of these systems in their organisations.

For IBM-watchers, this statement is, perhaps, the clearest indication yet of where the company sees its future growth. It should also be a clear indication to UK DP professionals as to their future role in their own companies. But before we all rush off to enrol at the local secretarial college note should be taken of where word processing technology alone fits into the picture.

According to Karlow, there are five ways WP and DP are merging. These include: the ability to produce quality printing for computer-based systems; electronic mail, remote job entry and file storage facilities such as COM.

## Getting to grips with word processing

Quite obviously, WP technology is moving on apace. No longer can it be regarded as an advanced level typewriter, the benefits of which appear to be concentrated on producing personally addressed sales missives or long-winded legal documents. Likewise advantages go beyond the ability to line-justify or incorporate a print-style format.

Technology, however, even for the office, does not stand still. Among the more knowledgeable, the term word processing is old hat. It is now referred to as text processing, with the government itself managing to find funds to finance a joint CSA/Department of Industry study into the implications of Text Processing in the UK.

One firm implication is that the UK DP professional will be dragged, however reluctantly, into the office home. The DP barriers could well be trampled

underfoot as TP links are forged. Whether such joint ventures will result in improved office procedures could well be a matter for doubt. The typical company office is far removed from the DP environment. Mills bottles are more prominently displayed than work manuals, umbrellas stand more visible than work rotas, and rubber plants feature more heavily than industry journals and reports.

Organising the office would appear to require more than an injection of WP machines and meeting operators. It will need the dedicated alliance of WP, office manager and TP expert. But there are, of course, the less publicised implications of WP. Will an IBM or Wang WP system interface with an ICL or Honeywell mainframe? Will future DP activities be limited to the hours of 9am to 5pm?

Karlow concluded his talk by

suggesting that DP is really only a small subset of word processing. On the basis of what IBM thinks today, the rest of the industry does tomorrow, perhaps an instant course in typing and filing procedures would be appropriate.

## 10 years ago

From Computer Weekly of June 11, 1970: THE computerised inter-firm accounting project, IFAC, planned by the Stock Exchange, has run into serious problems, and stage two has been deferred until 1971. A network of centres specialising in DP sales and support is to be established by British Olivetti. ICL won the biggest order in SE Asia with a £280,000 1804A system for the Hong Kong and Chinese universities in Hong Kong.

## Swiss ICL's £7.5m target

ICL's Swiss subsidiary is targeting turnover of 30 million Swiss francs, £7.5 million, this year from its 140 employees. The current installed base includes 12 1900s, one 2850, 35 2903 series machines and 140 System Tens. There are also 280 1800 terminals and over 500 point-of-sale terminals installed in Switzerland, to give ICL about 5% of the Swiss computer market.

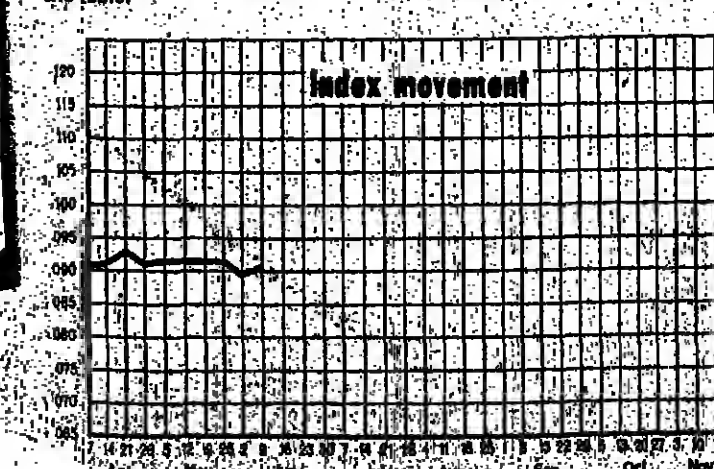
## Capital increase

OLIVETTI shareholders have approved a capital increase which involves French Industrial conglomerate St-Gobain-Pont-à-Mousson paying about £35 million for a 10% stake in the Italian company. St-Gobain already has 10% of the Franco-American CII-Honeywell Bull.

## CW SHARES TABLE

Date: 1980/06/11				Index: 2545.00			
London Stock Exchange		New York Stock Exchange		All International		All UK	
High	Low	High	Low	High	Low	High	Low
100	98	100	98	100	98	100	98
101	99	101	99	101	99	101	99
102	100	102	100	102	100	102	100
103	101	103	101	103	101	103	101
104	102	104	102	104	102	104	102
105	103	105	103	105	103	105	103
106	104	106	104	106	104	106	104
107	105	107	105	107	105	107	105
108	106	108	106	108	106	108	106
109	107	109	107	109	107	109	107
110	108	110	108	110	108	110	108
111	109	111	109	111	109	111	109
112	110	112	110	112	110	112	110
113	111	113	111	113	111	113	111
114	112	114	112	114	112	114	112
115	113	115	113	115	113	115	113
116	114	116	114	116	114	116	114
117	115	117	115	117	115	117	115
118	116	118	116	118	116	118	116
119	117	119	117	119	117	119	117
120	118	120	118	120	118	120	118

The table shows the closing prices in London and New York at the end of last week. The share index is based on the prices of the UK companies in the table.



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## '98% of our trainees placed in jobs'

THE article on Page Six on April 3, describing Kelemazoo's attempts to solve the computer staff shortage problem, has resulted in several letters from training bodies which disagreed strongly with the assertion that "people presently being trained are not really suited to the needs of industry."

The managing director of Computicons, D. F. Bollen, writes: "98% of people trained in our London centre last year were placed in jobs and of this a high proportion were repeat placements, in a wide range of firms which have previously taken our trainees."

We would be interested to hear from firms which sometimes take on trainees and which feel that today's training methods adequately meet their needs.

# Irish industry's growth results in higher salaries

WE don't hear much about the DP industry in Ireland, and when it comes to changing jobs it isn't the place many people seem to go. So it was interesting to receive a report and salary survey of the Irish computer business.

A Dublin-based consultancy, Computer Staff Recruitment, published the survey, which provides some enlightening information about business and pay in Ireland. For example, Irish people seem to be better rewarded than their English counterparts in computing.

An Irish junior programmer is, according to the report, a good 28.6% ahead of an English junior programmer, in terms of salary. This figure is reduced when one takes into account the currency conversion factor, but the difference is still substantial.

An interesting trend revealed by the CSR survey is that smaller companies in Ireland seem to pay much higher wages than the larger ones. For example, a figure of £3,750 is quoted for a junior programmer in a company turning over less than £2 million annually, which is surpassed only by the £4,224 salary earned by someone in a similar position working for a company at the other end of the scale which turns over £50 million plus.

Joe Rooney, managing director of CSR, expressed his concern for establishing salary levels across the industry in Ireland because of the recent rapid growth in the numbers of computer people employed. He said that computer professionals could now earn up to 50% more than colleagues working in other organisations — a figure that may shock some readers.

If this is true in Ireland, however, it casts an interesting light on the industry there and job prospects. The cost of living in Ireland is slightly higher than in the UK, but people working in the computer industry in Ireland seem to benefit more from such things as company cars, fringe benefits and loans than do their counterparts in other industries.

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## SOFTWARE FILE

# Inflation accounting boosts RTZ, Safe

THE two biggest contenders for the large market in fixed asset accounting packages are expanding their horizons, following the upsurge of interest in accounting software prompted by the newly adopted inflation accounting standard, SSAP18.

Both RTZ Computer Services and Safe Computing, whose packages Fascade and Safe share the greater part of this particular software market, consider that the adoption of inflation accounting in the UK will pave the way for the rest of the English-speaking world.

The sales of RTZ's Fascade (CW, April 3) have encouraged the company to explore the Australian market through an independent agent, Adapta Software, with an eye to further markets including Singapore, Indonesia and Hong Kong, where there are existing customers.

RTZ Director Paul Methven cited Australia as a good place to start in building up an international market place on which to capitalise in the future, since the country shares our inflation problems as well as being English-speaking.

He said that at the moment there were not many UK home-grown products able to compete with Fascade, and added:

"RTZ may soon be appointing agents in less established countries."

Safe Computing is also looking to the English-speaking market and has negotiated a marketing agreement with ICL to cover international rights to the package on ICL hardware all over the world, except for places such as the UK, Canada, and parts of Europe where Safe has its own offices.

Using its parent company, Chubb, Safe is also looking to non-ICL sites in such countries as Australia in launch Sifas, and is hoping to address the same markets as RTZ.

In the UK Fascade and Safe are not the only packages to get a slice of the action precipitated by the new standard. Marketers of PCL's Ace, Altraco's Spiral, Bund's Fascade (for Digital Equipment PDP-11s) and the fixed asset suite from Lowndes Ajax all report a flood of inquiries.

The prevailing opinion is that the real boom for packages will be in three or four months, although that would leave little time for the lengthy process of taking on data in order to meet the deadline of January 1981.

The statement of Standard Accounting Practice No. 18 aims to implement current cost

## Three join million dollar 'club'

THREE UK companies have entered this year in the ICP Million Dollar Awards, given to companies which gain over a million dollars sales worldwide for a product.

Transaction processing specialist Telecomputing of Oxford won the Five Million Dollar Award for its sales of TP8, the TP monitor for ICL equipment. Safe Computing, the bureau and software company, won the other Million Dollar Award for its sales of Sifas, the TP monitor for ICL equipment. Safe Computing, the bureau and software company, won the other Million Dollar Award for its sales of Sifas, the TP monitor for ICL equipment.

For the first time ICP has awarded a hundred million dollar award which went to Comcon for sales of the Total database system.

# Aid to measuring MVS performance

IBM users looking for real time information on the performance of MVS could be interested in a software tool being developed by performance management specialist Tesdata.

Among other features, it should be able to assess the effectiveness of systems resource management parameters and suggest how they could be changed.

From Tesdata's point of view, the software is intended to boost sales of its MS performance management systems and it will only be able to run on MS kit. Tesdata stresses that it is not moving into the software products marketing business.

The video terminal on an MS system running the software will provide real time access to MVS performance information and will also cover TP response times and the performance of VIO and VTAM.

Tesdata's existing MVS monitor, S-Pac, can only record

## Which people make the best recruits?

WE have written extensively about graduates, their opportunities, their training and their suitability for a job in computing. We have also made — and been criticised for — comments on graduates in arts subjects who are now finding themselves with few job openings, bar the ever-expanding computer business.

We have so far ignored, however, those graduates who have followed computer science courses at university and whose education has followed a distinct bias towards a career with computers.

How qualified are they? It is an accepted fact that academic qualifications obtained through universities bear little or no resemblance to the subjects as they are applied in the real world. An economics degree does not make an economist, an accountancy degree does not make an accountant, and a computer science degree does not make a systems analyst any more than a French degree makes you French.

Universities will no doubt argue that the courses they offer are not designed to provide a student with an automatic passport to a specific career, but to educate and train the mind, and are consequently not tailored to the requirements of industry.

Unfortunately, computer science graduates themselves will argue that as they know a great deal more about computers than graduates in other subjects, they should be offered positions in the industry.

Ronald Bain, marketing chief of Unilever Computer Services, was quoted in the Observer recently as advocating the recruitment of people with business experience, and abandoning altogether the policy of

recruiting new graduates into computing.

He suggests that more employers should take advantage of refresher courses in computing for intelligent and enthusiastic people from other industries.

F. Perkins, the managing director of I.P. Sharp, on the other hand, while he admits that students on sandwich courses can be useful, says that on the whole the quality of the graduates coming into industry is rapidly declining. Is this a fault of the universities and polytechnics, or does the blame lie even further down the line with the schools?

Or is industry at fault, for expecting educational institutions to churn out year by year exactly the right sort of person to fill the gaps in industry and solve the computer staff shortage problem?

## Codasyl compatible database for micros

A CODASYL compatible database management system for microcomputers is being distributed by US company Microsoft. The product, named Micro-Seed, runs under CP/M with Microsoft's Fortran 80 as the host language.

It is a complete subset of the Seed DBMS, which originated with International Database Management Systems, and the company claims that it is the first of its kind being able to cope with microcomputer applications where the database is too large for conventional file handling.

Micro-Seed is written primarily in Fortran, and is said to be transportable to various 8080/8085 hardware configurations. A 64K microcomputer is required to support the DBMS.

The data manipulation routines can be called from application programs, in Fortran or other host languages such as Cobol-80, Pascal-M and Basic, which will be available in future releases. Other future plans include a report generator, Harvest, and an interactive utility program, DBLOOK.

The system in its present form is available from the Belgian branch, Vector Microsoft, for about £500.

THE job accounting report system, Jars, marketed by Johnson Systems UK has been enhanced for DOS/VSE in Release 4.0 of the product. Jars is a performance measurement and billing system for long-term and day-to-day use, and is available for all releases of OS and DOS with options including CICS/VSE, TSO, VM/CMS, and most recently added, IMS/VSE (Software File, February 14).

A FORTRAN 77 compiler implemented to 1978 ANSI standard and written in Pascal has been developed by Advanced Computer Techniques of New York. The product was first developed for Honeywell Level 6 and can be customised to run on a variety of machines.

THE systems and programming group at Sherwood Computers (a subsidiary of the newly formed Sherwood Computers Group) has developed a new system for the rental of computer equipment and development needs in the UK and Europe.

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## OP SPOT

# How the typical trainee operator should spend his time

THE typical trainee operator spends far too much of his time cleaning peripherals and too little adding to and sharpening his skills.

Rather than studying the installation's applications, operating system and fault diagnosis procedures he is more likely to be found cleaning the printers, punch units, card readers or tape drives.

It is of course, important to keep the devices clean. But only insofar that dirt and dust can have an adverse effect on their functioning.

Tape decks for instance, should be thoroughly cleaned at least twice per shift. This prevents read/write errors which

are particularly annoying when they spoil the operators' chance of finishing the night shift early. The printers should be thoroughly vacuumed at the end of the shift. Print trains should be wiped with a piece of cloth, and this is particularly important when the printer is used for pre-printed stationery or forms which will later be read by an OCR device.

Punch card units should also be vacuum cleaned and their bins emptied. But please remember that child — the tiny sliding pieces of card that accumulate in the bins — can be a health hazard (if lit of the week, On Spot, January 18, 1979) and should be handled with care.

So keeping the peripherals clean is important. At some installations, however, the trainees are expected to perform duties which should be carried out by a site engineer or a cleaner.

Site engineer? At one installation I know, the trainees are expected to remove the print train before wiping it clean. They also have to open and vacuum clean the back of the printer.

A cleaner? At another installation trainees have to clean all work surfaces, video screens

and, if the site manager is in a particularly keen or bad mood, even vacuum clean the printer room floor.

Anyway, when the trainee isn't cleaning the peripherals, or mounting tapes or discs or loading the printers, he should try to learn more about the technical aspects of his work.

How? Well, the trainee must take the trouble to watch his senior colleagues in action and ask as many questions as possible.

The hard copy log is a valuable

source of information. Use it during spare moments to learn about system messages and see how commands are used.

To learn about job control language run some small jobs. The evening and night shifts are best for this. If they go wrong, so what? You will learn a lot by sorting out your errors.

Also look at the listing of users' jobs which have gone down with errors. But please don't try to put them right; you will only fall out with your operations manager.

## Incentives to change jobs

THE chance of a move into programming, a single shift system and a salary in excess of £5,000 per annum — these are the incentives to make an operator give up his job and move to another installation, according to a salaries report from Modern Computer Services.

By the term "operator", the report means someone with one to two years' computer room experience. In London and the Home Counties such a person gets a salary in the region of £4,000 to £4,500 a year.

The report goes on to point out that an operator with good JCL and utilities experience is more likely to be attracted by a more senior and better paid position.

The average senior operator — that is, someone with two to five years' experience, including shift leaders — earns between £5,000 and £5,500 a year. A salary of over £7,500 is needed to tempt him into a move.

It points out that job advertisements for the position of operations or shift manager usually get a good response, with many from shift leaders who have too little experience or just aren't equipped for the job.

\* This figure refers to London and the Home Counties.

by Bernard Allen

## High price, high quality rating on 5520 word processor

HIGH price and very high quality is the rating given IBM's 5520 shared logic word processing system from the company's General Systems Division.

It is based on the processor technology of the System 34 workstation-based business system, and comes in four models, 20 to 50 (CW, November 15, 1979). The 20 comes with six workstations and three printers, and the 50 has a maximum of 18 workstations and 12 printers, which can be ink-jet or daisywheel.

Although looking like the standard display terminals offered with other GSD products such as System 38 and the 5280 remote terminal system, the 5520 single and 5524 dual workstation terminals are specific to the 5520, and feature special typewriter like keyboards. The only internal intelligence is applied to things like character fonts, while the word processing software all resides in the central station.

Upgrades are achieved by adding processors within the central unit, but IBM refuses to reveal the numbers of processors involved or the maximum which can be included. Three versions of the basic processor are used in untested combinations. They are the central processing unit with word processing software, the terminal controller processor, and the communications processor. In the case of the last up to two, each supporting up to 16 lines can be attached.

For the user, the most attractive feature of the system is the enormous range of help commands available, which are extremely detailed and explain to the operator how to use the system from a much lower level than is normal on a word processor. There are over 1,000 different help functions, making the 5520 unusually easy to use.

## Japanese language WP from Fujitsu

HOTTEST property from Fujitsu on the company's home market in Japan is a new Japanese language stand-alone word processor, the NTW-100.

It comes with a new keyboard specifically arranged to take account of the frequency of usage of each character.

The Japanese language is primarily written in two forms, Kana and Kanji. Kana is a syllabary where each character represents a phonetic sound and it has a manageable number of common characters. Kanji is a set of ideograms based on the original Chinese characters, and is virtually unlimited in the number of different ideograms which may be required, but it is generally agreed that in most applications 8,000 to 9,000 will be enough.

Although Kana is much more manageable than Kanji, Japanese prefer to read Kanji; newspapers and books are printed in Kanji with unfamiliar words expressed in Kana. Despite the enormous number of Kanji ideograms which may be needed, people generally leave school in Japan knowing only about 2,000 basic ones.

The new NTW-100 word processor, which comes with screen, 16-dot matrix and two floppy disc units, and costs £2.7 million, a little over £5,000, has a Kana keyboard, but the machine translates Kana syllables into Kanji ideograms, and these appear on the screen.

Although of interest in other Asian countries such as Hong Kong, Korea and China, the NTW-100 has no direct relevance in countries which use the Roman alphabet.

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## Colour graphics on HP desk-top series

COLOUR graphics display, with complex graphics computation, is offered by the HP Series 8000 system 45C introduced by Hewlett-Packard. The desk top 45C provides the user with a graphics language consisting of 70 statements that relieve the user of programming jobs like generating geometric figures. The standard 45C system with 16K bytes of memory costs about £23,150.

The colour commandr in the graphics language allow alphanumeric and vectors to be displayed in any of eight colours. Different levels of intensity provide a choice of up to 4,913 shades according to Hewlett-Packard. Each of the three electron guns — red, green and blue — is program controlled. The 560 x 445 dot display is said to be the first raster screen with a tracking cross. A light pen is supplied as standard.

Hard copy is generated by an 80-column thermal printer. Other 45C features include a ROM based operating system and H-P's enhanced Basic language.

## IBM announces field upgrade from 4341

THE long-awaited 4300 model to slot between the 4331 and 4341 has been announced by IBM as the 4331 Model Group 2. First forecast for launch last summer it is, as predicted, a field upgrade from the basic 4331 (CW, May 24, 1979).

Maximum main memory is quadrupled to four megabytes,

the same as offered on the 4341, and an 8K-byte cache is added; only the 4341 previously had a cache.

In addition to the cache there is 128K-bytes of reloadable control storage, and as well as the byte and block multiplexer channels from the 4331/1 there is a high speed block multiplexer

channel from the 4341 which supports the 3830 and the new 3880 disc controllers. A second optional adapter for attaching 3310, 3340 and 3370 disc drives is offered.

Field upgrades, which will be available in the first quarter of next year, will take two shifts, and involve laying on additional

power, swapping some processor boards, adding a second processor input-output bus, an additional microprocessor and more channel adapter hardware. First shipments of 4331/2s are set for last quarter 1980, and a minimum configuration costs £80,000 with 1 megabyte of memory and no options.

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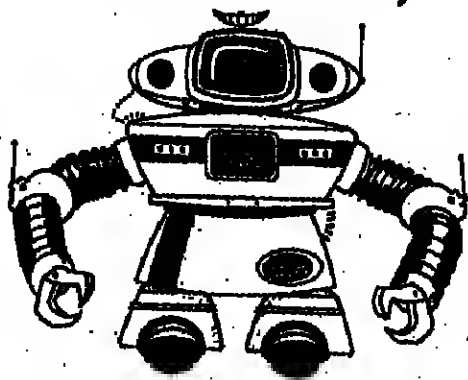
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## Bonnie goes Dutch....

BONNIE O'SHEA, the centred operator featured in Op Spot (CW, March 18) is currently on a six-month assignment in Utrecht, Holland, she is working at Volharding, a dairy product company.

"I got the contract while on a week's holiday in Amsterdam — and it's just what I wanted. There are three of us operating a Philips mini. We work overlapping shifts — even in the morning till three in the afternoon, and 11 in the morning till seven in the evening."



## Communication vital to development

THE operations department is all too often on the receiving end of poorly-documented systems which have been written with the scantest of attention to scheduling requirements.

Once accepted, such applications cause operations and users all sorts of problems, particularly when things go wrong and restarts and reruns are necessary. They disrupt the running of operations and the site as a whole.

It would be unfair to put all the blame on systems and programming. Quite often they just don't get enough help and suggestions from operations and the user.

The data centre impact statement — a series of documents, including checklists and project checklists — is one way of keeping operations, users and upper management in touch with systems being developed, according to a portfolio from Auerbach.

Entitled the Data Centre Impact Statement — General Procedures, the portfolio stresses that communication between different sections of the installation is vital to project development.

"When the Impact Statement is used, each data centre section supervisor is responsible for monitoring the appropriateness of the part of the project that will affect his particular area. Thus, sections within the data centre have valid reasons to require specific information about the project, and can use the Impact Statement to communicate their approval of the project to management."

In order to maintain consistency, all new or changed systems must be controlled through the Impact Statement. Assuming the department uses a project management system (and if not, such a system should be introduced) all projects faced under that system, regardless of their size, must also be monitored with the Impact Statement.

each of his team is working according to the proper time-scale and standards.

"Misunderstandings about input documents, control cards, operations, scheduling, system run times, and so on can be more easily resolved to the mutual satisfaction of the project leader, the users, and the data centre prior to implementation, because the detailed checklists in the Impact Statement will reveal those items in the project that have not yet been completed."

Members of upper management find the Impact Statement useful for two main reasons: it keeps them up to date about project development and provides different views on how it will fit in with and affect the organisation.

The first step in the procedure is to assign someone to gathering information and generally co-ordinating the statement. According to the report, the job should be given to the hardware specialist, provided the site employs such a person.

He should then meet with the project leader and get information on the nature of the project, its scope and length, the team members, and the user areas affected by the project.

The Impact Statement provides for review at three stages of the project: general design, detail design and system testing.

If the general design is well

done, it should provide sufficient detail to complete all sections of the Impact Statement. While this information will often change as the project moves towards completion, these estimates will at least provide a general picture of the project.

All items on the statement should be completed during the second, or detail design phase. "As a part of the detail design review, the project leader should provide as close an estimate as possible of the anticipated run-time for the entire system."

"Estimates of total run times given at the end of the detail

design phase will often change by implementation time, but the project team should be able to produce firm, dependable run-time estimates at this point."

Using the final report and the Impact Statement, the data centre manager can determine whether the project is complete and satisfactory from all viewpoints — the project team's, operations, and the user's.

\* Data Centre Operations Management, £120 including bi-monthly updates (of which the above is one). Distributed in the UK by Computer Aid for Management, 155 Great Portland Street, London W1. Tel 01-637 9088.

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## PEOPLE and EVENTS



### Technology Award for Malcolm Peltu

EX-COMPUTER Weekly editor Malcolm Peltu (on the right in our picture), now a freelance computer journalist, is congratulated by Lord Thomson of Monifieth on winning the specialist prize in the Technology Writers' Awards.

The articles that won Peltu the £750 prize were on human factors in computer systems, and computer crime (International Management) and artificial intelligence, and the office of the future (New Scientist).



Locke-Hooper Hall

### UCC announces top level changes

THE man who set up the University Computing Company's operations in Europe, John Kason, has stepped down as general manager of UCC Europe several years after moving to

Dallas, Texas, where he is now president and chairman of UCC's parent company, Wyly Corp.

Another important change at UCC is that John Weston, formerly chairman of UCC (Great Britain) Ltd, has left the board and retired from the company. His responsibilities have been assumed by Roger Pierpoint who has been with UCC in the UK since 1968 and who was formerly in charge of the operations side of UCC's network utility. He now carries the new title of general manager of UCC (Great Britain) Ltd and of the European computer utility network, which is based on Univac 1100 series mainframes located at Euston Road in London and at Birmingham.

Pierpoint will report to the new general manager Europe, Hugo Birrer, formerly managing director of Automation Centers International, ACT, which is UCC's batch bureau group in Continental Europe. In his new post Birrer will be in charge of all of UCC's activities in Europe.

Subject to board approval in Dallas, Roger Pierpoint will become a vice-president of UCC, while Hugo Birrer will be made a senior vice-president of the company.

Gil Whitesman of Ferranti has been appointed to the Singapore-based position of sales manager, Far East. He was formerly a senior sales executive with special responsibility for Naval systems in the Far East.

Howard Locke-Hooper has left Allied Business Systems where he was head of software development, to join Dicoil DataSystems. He is to be a technical support manager.

Sir Arnold Hall has been elected Chancellor of Loughborough University. He succeeds Lord Pilkington who is to resign after 14 years in office. Sir Arnold is chairman and managing director of the Hawker Siddeley Group.

Andrew Shaw-Hamilton, previously London branch manager of UCC, has joined Tymshare as manager, special accounts. Ron Whitfield has joined the Tymshare sales team from Roneo Vickers, where he was involved in financial analysis and marketing.

Bob Smith has become president of Mergenthaler Linotype Company of America, and is succeeded as managing director of Linotype-Paul in the UK by Anthony Alfano, previously vice-president, finance, for the Mergenthaler Group.

Tom Bsker has been promoted to sales manager at Cardkey Systems, manufacturers of electronic access control equipment.

### NCR golf dates

THE venues and dates for the four regional heats of the National Long Drive Golf Championship, sponsored by NCR, have now been fixed. They are August 1, 14, 24 and September 8 with the final due to take place at Stoke Poges Golf Club on September 28.

### New branches

AN international headquarters has been set up in Berkshire by Clapham Data Products of San Diego, California. It will be headed by European marketing manager Michael Brown who joins Clapham from Eplcom in Florida.

Its address is Kingswell House, Sunninghill, Berks SL5 7BJ. Tel: 0980 23491.

SOFTWARE house Fraser Williams has opened a branch at Tower Lane, Bristol. Branch manager is Tom Jones, who was previously managing services manager at Robertsons Foodia. He is supported by Aie Dawson, who has transferred from Liverpool.

The new branch is at Queens Chambers, Tower Lane, Bristol BS1 2JN. Tel: 0272 214641.

# Leap forward in technology for small systems

UNDERNEATH the new Honeywell DPS-4 and Univac System 80 lie significant advances in technology for small mainframes. The Honeywell machine features a generalised bit-slice processor used for CPU and several controller functions according to microcode. The Univac machine is built around twin 8-bit custom ECL bit-slice microprocessors which are offered as a product by Fairchild as the F100220 (CW, November 2, 1978).

Honeywell Italia has adopted the ubiquitous AMD 2801 bit-slice microprocessor to emulate the 34-bit engine of Level 62 — but it has gone further. Instead of developing a single central processing unit with the Level 62 instruction set, Honeywell has designed a single 24-bit Generalised Computing Unit consisting of six AMD 2801s plus peripheral chips on a single board.

According to the read-only memory microcoded instruction set plugged into the board, the GCU can be turned into a central processing unit with the Level 02 instruction set, an input-output processor controlling consoles and unit record peripherals, plus eight synchronous or asynchronous lines, a disc processor, a multi-line communications processor, a "foreign disc" processor and an emulation processor.

Under development is an H-MOS chip set consisting of three devices which replace about 200 chips used in the Generalised Computing Unit. Most important of these is the arithmetic-logic unit, effectively a 24-bit wide bit-slice microprocessor with six much-reduced AMD 2801s on board, plus several other circuits, replacing a total of 70 chips in the existing DPS 4 processor.

The second chip is a control sequencer replacing four AMD 2809 microprogram sequencers and 81 other chips in the present processor. The third chip is a bus control unit replacing 60 chips. Although this last is probably too specific to the bus architecture of the DPS 4, the other two chips might well be of interest to other manufacturers, particularly those like ICL and Harris with 24-bit machines in their product lines. The chip set is being developed jointly by Honeywell Italia and the parent company in the US, and samples are already under test at the Italian company's research and development establishment in Pregnans, near Milan. At present there are no plans to offer it to other manufacturers.

The technology used, H-MOS, is claimed to have a propagation delay of three to four nanoseconds per gate, and Honeywell is targeting performance out of the new processor to match that of the existing AMD 2801-based product. However the design does include one extra interrupt level and better facilities for communications. H-MOS is an Intel proprietary technology combining the low power consumption of C-MOS with a speed approaching that of TTL.

The practical limit in the new DPS 4 is 10 processors and two main memory units at present. Expansion capability in the architecture is to 12 processors and four main memory units for a maximum of 18 megabytes of main memory. The GCOS-4 operating system is identical to GCOS-62 as far as the user is concerned, but has been extended so as to be able to dispatch work to up to three CPUs according to loading; GCOS-62 is available only in a uniprocessor version. Apart from one to three CPUs, DPS 4 can take one emulation processor and the only one presently offered is for Honeywell's Level 61. The French machine, successor to the Bull 68, is a small transaction processing machine, and although CIL-Honeywell Bull has a replacement in the DPS line under wraps, emulation is to be provided for people wanting to upgrade to DPS 4. This will mean that, within the same computer, users will be able to run their old Level 61 programs under GCOS-61 and newly developed programs under GCOS 4.

Also supported on DPS 4 are one or two disc processors, one or two input-output processors, one to three multi-line communications processors, and one foreign disc processor for people who want to transfer incompatible discs to DPS 4.



The DPS 4 final test area at the Caluso factory of Honeywell Information Systems Italia.

### Level 66 and Level 68 come closer

A MULTICS version of its new DPS 8/70 large-scale mainframe and a low-cost version of the Level 68/DPS Multics system have been announced by Honeywell in the US. Honeywell has been bringing Level 66 and Level 68 closer together over the past five years and the new announcement is a further major step forward in commonality.

DPS-8 is the successor to Honeywell's Level 66 36-bit line; the DPS 8/70-M model will be emulating the 32-bit Multics machine. It will address up to 04 megabytes of main memory and support up to six CPUs. Base price is \$1.3 million in the US.

The Level 68/DPS-M is a single processor system claimed to match the power of its dual processor predecessor and represents a dramatic price reduction — down from \$1.2 million to \$640,000. Multics is the name given to systems designed to run the inherently secure time sharing operating system developed at the Massachusetts Institute of Technology.

### ICL speeds up US launch of 2903 replacement

ICL plans to storm the US with its new ME29 computer, replacement for the 2803. The US launch has been brought forward nine months to this month and the decision is based on more success than anticipated in recruiting, and better than expected acceptance of the machine in other countries.

Over 100 have already been ordered, with over 60 coming from new customers. ICL will initially concentrate marketing on the East Coast, where it has sold between 25 and 30 2903/4 machines. ICL now sells its System Tan and 1500 computers and 9500 point-of-sale systems out of an operation headquartered near Dallas, Texas. Large systems are being marketed out of Virginia and the company has also established its own maintenance and support network with headquarters in East Brunswick, New Jersey, from which the ME29 are likely to be sold. Biggest ME29 order so far comes from the Booker Belmont Wholesale Delivered Trade division of Booker McConnell.

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# Nixdorf challenges IBM with own operating system

CHALLENGE TO THE 4300

Nixdorf plans to enter the lower end of the IBM compatible processor market with its own line of Siemens 3801 and 3802 machines, to offer a complete system with an IBM-compatible rather than an IBM operating system.

Siemens 3801 operating system is Fujitsu's OS/VS-1 which is a fully compatible

to write of IBM's MVS. Nixdorf has acquired the Computer Software Company of Richmond, Virginia which has developed compatible but much-enhanced versions of IBM's DOS and DOS/V.

Nixdorf has still not announced a processor, but US industry sources say the company plans to build Two PIs V32

processor under license in West Germany. This would be consistent with Nixdorf's existing manufacturing activity since the company limits a number of standard processor modules using the AMD 2900 family of bit-slice microprocessors and particularly them to applications such as the 8870 business computer and 8864 banking terminal processor by use of microcode.

The Computer Software Company has 100 employees and 750 customers for its EDOS and EDOS/VS operating systems. Turnover last year was about \$5 million, and a total investment of \$11.5 million in the company by Nixdorf includes the purchase price.

EDOS/VS is claimed to have all the features of DOS/VSE, the enhanced version announced by IBM with the 4300 line, and also to have some features from OS/VS.

IBM DOS/VS programs in Basic, Cobol, RPG, Fortran and PL/I are claimed to run unchanged under the EDOS operating systems.

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## Elbit ready with CPU for the European market

EUROPEAN involvement in the IBM plug-compatible processor market is growing rapidly with several unnamed companies preparing to announce products based on a new processor, the ANAT from Elbit of Israel; and Olivetti of Italy taking a stage of up to 40% in specialist manufacturer IPL Systems of Bedford, Massachusetts.

Elbit, 37% owned by Control Data and hitherto best known for its PACT business and key-to-disk systems, has developed a low-end 370-compatible processor available in three models, the ANAT I, II and V, covering the power range of System 370 from the 125 to the 148. Maximum main memory is 4 megabytes.

Nixdorf has had detailed discussions on the ANAT (CW, February 7), but it is uncertain whether the West German small systems manufacturer will adopt the ANAT or the rival V32

from Two Pi in California. Nixdorf is expected to announce its choice shortly.

The ANAT I is turned into an ANAT III, equivalent to a 138 or 4331, by adding 80K-bytes of fast control store. Adding a pre-fetch pipelining facility turns the ANAT III into an ANAT V, claimed to match the 370/148.

An input-output processor with an aggregate data rate of five megabytes per second emulates the IBM bit and byte channels.

A total of six channels, up to five byte multiplexers and up to three block multiplexers, are offered with a minimum one of each. Minicomputer peripherals as well as low-end IBM 370 peripherals are supported, and Elbit is offering an IBM 3330-type disc drive. Up to eight drives, each with 100 or 200 megabytes of storage can be supported. Operating systems

supported are DOS/VS OS/VS1 and VM/370.

Control Data is considering marketing the ANAT in the US. Although the largest CDC conflicts with the smallest CDC Omega which comes from IPL Systems, the ANAT addresses a different market and would generally be sold in small expandable configurations.

First shipments of the smaller two models are set for the latter half of 1980, with the ANAT V following in the first half of 1981. Elbit has an extremely ambitious programme with a target of 500 machines in the second year of manufacture.

Marketing is likely to be mainly by OEMs, but the UK subsidiary also plans to sell the ANAT to end users, both in association with software houses and as an upgrade, with some conversion, for its existing PACT users.

## Nanodata eyes other current mainframes for emulation

KEY feature of the new IBM plug-compatible processor offering from Nanodata Corp. is a microcode overlay for the DOS/VS, VM/370 and MVS operating systems which, the company says, enables the operating systems to manage an indefinite number of CPUs. Having produced its IBM-compatible machines, Nanodata is eyeing other current mainframes for emulation, but is not saying at this stage which manufacturers are its target.

Three models of its 6300 series have been announced. The initial model is the middle one, the 6336. Available immediately and coming with one to four megabytes of main memory, the 4336 is claimed to be 3.5 times as powerful as IBM's 4331 Group 1 model. The 8333 model, claimed to offer 17 times the power of a 4331 Group 1, is set for delivery next January and will have 512K to 2 megabytes of main memory.

The 6343, the first dual processor model, will follow later in 1981 and again will have one to four megabytes of main memory. Each model will be field-upgradable to the next in the line.

Nanodata says that the key to its design is complete physical and logical separation of input-output and memory.

All mapping is done by memory itself, and the service processor only handles system start-up and local or remote diagnostics via a diagnostic

bus," a spokesman told Computer Weekly. The technology is TTL with some embedded ECL. According to Nanodata, a significant advantage the machines offer is the possibility of unattended remote operation, not possible with IBM's 4300s.

Unlike Amdahl, which has just announced its intention to sell its software to IBM users without Amdahl machines, Nanodata has no plans to market its software except to its own customers. "It's all in microcode, so it would be difficult to apply to an IBM machine."

As well as doing emulations of other machines, which will definitely be "living" machines rather than ones like the Xerox Sigma which Telefilm is emulating, Nanodata plans to add more processors to its central complex, and to get closer to true "non-stop" operation.

## Eight mips machine

NATIONAL Advanced Systems is likely to announce an IBM compatible machine with a power of eight million instructions per second by the end of the summer. Built in Japan by Hitachi, the machine will probably be the same or similar to the model introduced last year by Intel as the AS/8-7034 (CW, July 19, 1979).

Following the collapse of the computer business, National renegotiated the agreement with Hitachi covering the machines sold by Intel as the AS/8-7034 and AS/7-7033 which now form the National AS/7000 family. An agreement between National and Hitachi on the AS/8 machine probably would have been announced by now, but for the delay in the introduction of the H-series. It appears that National is now looking for a partner in the H-series market.

National Advanced Systems, Floyd Kyamie, has confirmed that the development of the large scale IBM compatible machine codenamed "Lightning" is National's development centred in San Diego has been scrapped. Kyamie told Computer Weekly that National was carrying on with one surviving processor development programme. He would give no details of the machine, but industry sources indicate that it will be a medium scale machine somewhat larger than the biggest processor currently built by National, the AS/5000, which matches the IBM 3035. The new machine is codenamed Shark.

Nearly last year National axed the low-cost IBM-compatible System 400 processor aimed at the OEM market and Kyamie told Computer Weekly that National was no longer interested in moving back into the OEM side of the business.



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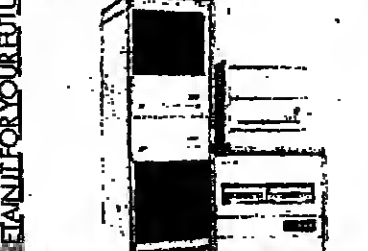
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CDC Phoenix controller for LSI 11	£2800

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## THE NCC AT ANAHEIM.....

## Software industry 'monster' by 1990

The software industry will be a monster by 1990 — and you'd better believe it.

That was the message from John Linley, chief executive of Management Science America, which, with 700 people, 4,000 customers and \$35 million turnover last year is targeting \$40 million in 1990.

In whirlwind lunchtime session he gave his view of the decade ahead, in which 10% of company chief executives will be coming up through the computing ranks and in which software companies will become the NEC's and the Data Generals of 1981.

"How a country handles its data will become more important in the 1980s than how it handles its energy resources," he suggested. "Japan is already outstripping the productivity of their programmers is four to five

times that of ours. Linley's talk was laced with biting humour. He announced, "At least today, a merger was declared between Honeywell and Fairchild. The new company is to be called Farwell Honeychild."

Today the schoolyard hero is not the champion of pitch and toss; he's the kid who can crash the college computer and get to the database. Our children should be playing with personal computers at the age of 10."

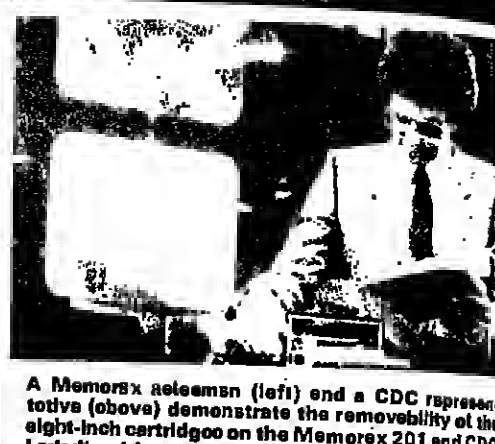
Underlining the training-for-millions taking place in the industry, he noted that Radio Shack was selling payroll packages for \$18.95 where traditionally such things cost anything from \$20,000 to \$100,000 — and that Sears Roebuck and Co. had teamed up to develop a 9in satellite dish antenna for \$350.

That compares with satellite earth stations which cost \$2 million in 1975.

"There is more enthusiasm about the Apple III personal computer than about IBM's H-series," he declared.

He quoted a forecast that in 1990 IBM would consist of five divisions. DP Division would be twice the size of the whole of IBM today, and getting 50% of its revenues from software. GSD and Office Products would be combined and serving the "office of the future" market.

Recognising the high value of peripherals division would be marketing to all comers. IBM would be back in the services business, offering access to huge databases. And the fifth division would in effect be a bank, reflecting the enormous leasing revenues.



A Memorex salesman (left) and a CDC representative (above) demonstrate the removability of the eight-inch cartridge on the Memorex 201 and CDC Lark disc drives.

## Launch of 8in cartridge drives

MEMOREX and Control Data both introduced eight-inch Winchester type disc drives with removable cartridges at NCC. The big advantage offered by these units over existing eight-inch Winchester drives with all fixed platters is that no back-up is required in the form of a floppy disc or magnetic cartridge tape unit.

The Memorex 201 provides 125 megabytes of storage on a fixed platter and another 12.5

megabytes on the cartridge while the CDC Lark, offers eight megabytes of fixed and eight of removable storage. The CDC unit, which has been expected for some time, is available for evaluation now and volume shipments should start in the third quarter of 1980 according to CDC. The Memorex 201 will not be available in volume until the first quarter of 1981.

Both drives cost about \$3,000 in single units but the OEM discounts do not look as dramatic as those available on units with all fixed media.

Surprisingly, four other prominent firms in the eight-inch Winchester business — Shugart, BASF, Perdec and Kennedy — all

expressed a distinct lack of concern about the CDC and Memorex announcements. A BASF spokesman said his firm had no plans to develop an eight-inch cartridge unit and commented that the removability of the media defeated the reliability purpose of Winchester drives. A Shugart spokesman pointed out that the cartridges on the Lark and 201 were non-standard and as a back-up medium were far more expensive than either diskettes or tape cartridges. Perdec said that it was not developing an eight inch cartridge unit while Kennedy remarked that it was looking at the market and might go ahead with developing a cartridge drive.



JUST in case visitors to the NCC did not realise they were from the UK the true blue Brits on the stand of Leicester-based software house Tube drew the point home by adorning everything, including themselves, with Union Jacks. And if that was not enough they even tried to recreate the atmosphere of an English pub by equipping the stand with a dart board.

The serious intent of the Tube exhibit was to promote the company's powerful systems development aid, Cupid, which is spearheading what the firm described as a "major assault" on the US market. Tube was armed with facts like the selection of Cupid by Digital Equipment for use on its own in-house accounting systems in Europe.

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## Relational databases 'just around the corner'

RELATIONAL databases role OK! That was the clear message from the NCC session on database architecture. After three speakers had reviewed potential developments: distributed databases and various kinds of database machine, the subsequent panel session was devoted almost exclusively to relational databases.

Called on the wave of the future for ten years, relational databases were agreed to be just around the corner, with a variety of products close to introduction.

Session chairman Dennis McLeod of University of Southern California at Los Angeles, defined the relational model as consisting of flat files, with independence of data, and a

high level language for data manipulation. The low level data manipulation language of the Codasyl model was seen as its potentially fatal limitation, especially in distributed database applications where message transmission is expensive. The relational model was also seen to be simpler to conceptualise.

Mike Blasgen, of IBM's research centre at San Jose, supported the proponents of relational models with a list of the needs of the end user — and with the widespread dislike of IBM's IMS. It was noteworthy to hear an IBM'er saying it.

End users, he said, wanted ease of use, reduced complexity, preservation of centralised control in the face of decentralisation, adaptability, appropriate

functionality, and reliability, restorability and auditability.

"The relational model will prevail," he declared.

He was sceptical about the widespread use of natural language query systems, and was backed in this by Mike Stinebaker, of Berkeley, who thought that natural language systems would be great sales gimmicks but would be little used in practice.

From the floor came an interjection from a representative of the US Department of Defence who remarked that the DoD was now largely restricted to recruiting high school dropouts, yet the employees using a natural language query system learned and used it so easily that they never made use of the training courses available.

This did not refute the general

case that natural language is largely a relative term and that some formal structure will be imposed on almost any so-called natural system.

Blasgen pointed out that even radio hams, CB enthusiasts and the police used their own form of code on radio, simply because it was unambiguous and more efficient than free form speech.

Underlining that ICL's CAFS is even less understood in the US than in the UK, Stinebaker dismissed it as a "fancy disc" system which would be used by libraries but by few other people. The fact that the first commercial order has come from De Beers, a commercial user with a mass of ill-defined data between which the relationships are frequently changing, seems to suggest that there is rather more to CAFS than that.



## Wild West comes to town

DISPLAY terminal manufacturer, Saroc Technology, a local Anaheim firm, underlined its pioneering spirit with the Wild Frontier stand at Anaheim. Apart from prospectors and pretty girls, the main exhibits were Saroc's new low cost IQ 120 and IQ 140 VDU's which will be available in the UK from the sales office being opened in London by the US firm in the next few weeks. The name Saroc is an anagram of Core, a well known brand of beer in the US. The legend has it that Saroc executives were drinking Coors beer at the meeting held to select a name for the company. What's more the Saroc symbol is the top of a Coors beer can.

## Industry urged to back university research



PACKARD... "Support for research pays off."

TWO clear themes came out of the National Computer Conference at Anaheim: the need for companies to do much more to back universities and support schools, and the need for fiscal measures from the US government to aid the industry.

Giving the keynote address at the start of the conference, David Packard of Hewlett-Packard was emphatic about the need for companies to spend more on supporting research in universities. His company was doing it, he said, and the effort was paying off both in terms of new techniques which could be applied to its business, and in future employees for the company.

Edson de Castro, one of the founders and presently head of Data General, echoed the need for more industry backing of research in universities, and included it in a fiscal package which was similar to the one formulated by Packard. This included the allowance of support for university projects as a charge against taxation, the

possibility of writing off equipment donated to schools at full market value rather than its written down value; tax credits running at 25% for any increase in the computer industry's already high investment in research and development; and a restoration of the previous position with regard to stock options in employee incentive schemes. Formerly, capital gains were not payable until the stock was sold now it has to be paid as soon as the option is exercised.



## IBM promotes colour monitor

THIS colour monitor forms part of the IBM 3270 interactive colour display system, the first fully integrated product on the IBM stand at NCC. Suppliers of plug-in modules for the IBM 3270 series products at the show included the IBM 3270 series products which have a 3270 interface — yet, with the new 3270 series products, IBM has introduced a competitor for the 3270. The biggest worry apparently would be finding a sufficiently cheap supply of colour CRTs from Japan. Both firms are waiting to see how well or otherwise the 3270 is received by users before making a decision to go ahead themselves. Scandinavia is particularly keen on colour data, but IBM has hit an unexpected snag in Germany. It seems that pressure for equal treatment of employees is so intense in the Federal Republic that managers interested in colour have decided against it on the grounds that it could involve a colour display as the others will want one too, and that changing all monochrome VDU's for colour would be too expensive.

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## MICRO NEWS

## Maintenance for Pets and Apples

A SUBSIDIARY company called Terminal System Services has been set up by Muletron, the Derbyshire-based terminal and DEC-based microsystem supplier, to provide a maintenance service for its range of products. TSS is also undertaking service work on personal computers such as Pet, Apple and Superbrain.

The company provides two forms of service to its customer. For the one-off repair job, it offers a "bring and we'll mend" type of contract for a fixed labour cost of £25 per unit plus the cost of parts.

The operation is controlled by the base workshop manager, John Rees, who carried out a similar type of repair service at Luton-based Pet distributor, Isher-Woods. Facilities at the Helder workshop include

computer-controlled board testers which can cope with high volumes of boards.

TSS also runs an on-site maintenance service from a string of centres in Glasgow, Manchester, London, Portsmouth, Bristol and the Belper headquarters. As the workload increases, the company plans to set up more service centres. For a related support cost of about 15% of the hardware value, TSS will maintain a customer's system under a comprehensive cover.

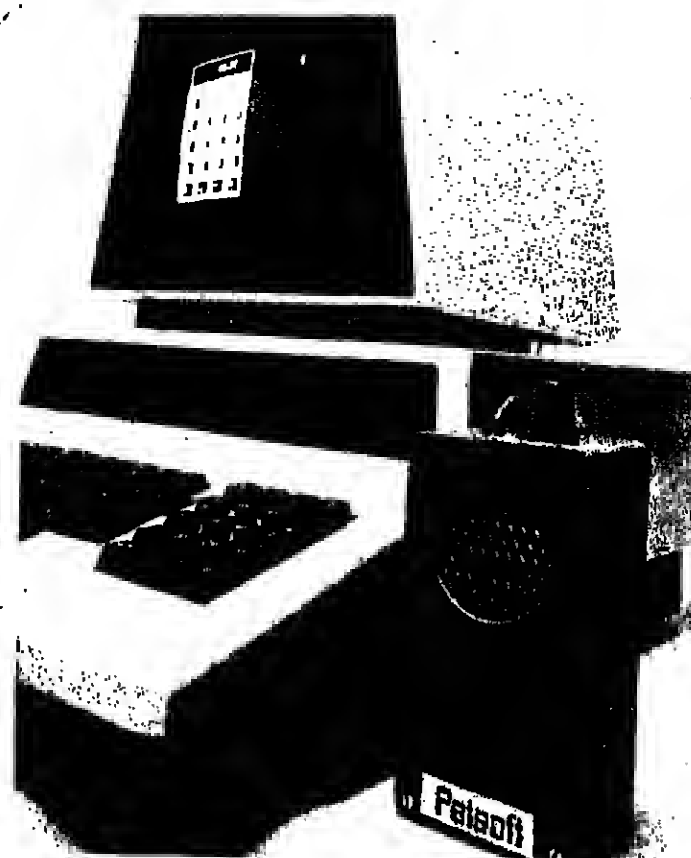
Modules are exchanged where possible and functional spare assemblies are located in most service centres to support the field commitment. With products like the Superbrain complete units can be exchanged and returned for depot repairs. The managing director of,

TSS, Jim Myson, who previously worked for Digital Equipment's field service marketing department, has already taken on several customers. He sees the market, which up to now has been grossly underserved, as capital intensive and an area of dramatic potential growth.

Myson's service is geared to meet the correct customer expectations. Immediate attention is given to emergencies, when a customer cannot wait long for an engineer.

## Alpha dealers

EIGHT more software and systems dealers have been appointed by Alpha Microsystems, bringing its UK network up to 18. The company claims that it has now reached half of what it believes to be an optimum size for a dealer network.



by Eileen Stainer

## Competitor for Texas' talker

A "TALKING Calculator" program (available from all Pet dealers, and by mail order from ACT Petsoft for £10 plus VAT) is the first strategy in a speech synthesis strategy which could provide Texas Instruments with future competition to its TI 99/4 talking home computer (CW, April 17).

On insertion of the Talking Calculator cassette, a picture of a calculator appears on the Pet screen to provide a visual representation of each calculation. As each key on the numeric keypad is depressed the Pet avatar speaks the name of the key. The end result is the Pet talking through a calculation as the user works through it.

An external piece of hardware known as a User Port Speech and Music Generator, with volume control and connectors, is required with the process. This consists of a loudspeaker to produce each sound and is available for £27 plus VAT.

By using the speech option it is easy for the user to detect errors as they are made. The presence of sound also enables blind people to use the Pet, and Petsoft has already received enquiries from the Royal National Institute for the Blind.

Compared with TI's talking 99/4, which is aimed directly at the consumer market, the Pet talking calculator is meant for more serious use and can be implemented at a much reduced cost. Although the Pet speech system does not have so much to offer yet, the cost of hardware plus a speech synthesis program totals £37 plus VAT twice.

ACT Petsoft's talking calculator program can be followed through on the screen of the Pet. See story, column 8.

## Intel profits well ahead

First quarter net profits have been reported by Intel to be \$24 million on a turnover of \$205.2 million. Previous year's results showed a net profit of \$15.3 million on a turnover of \$135.3 million. The company expects to spend \$180 million this year on new equipment and facilities.

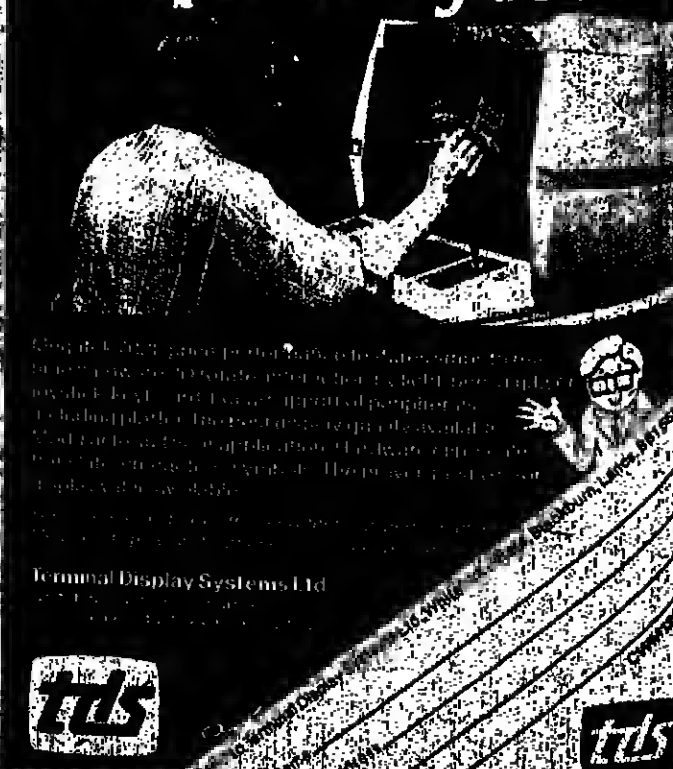
## Horizon hard disc from North Star

WINCHESTER back-up is available for Horizon systems with the introduction of an 18-megabyte hard disc enhancement from North Star Computers. The cost of a Horizon and the disc system, which includes 64K RAM, two quad-capacity minifloppy disc drives and one hard disc, is \$9,329. Up to three additional hard discs can be added to the same system at a cost of \$4,989 each.

## Floppy for AIM

THE first floppy disc system for use with Rockwell's AIM 88 system, called DAIM, is available to users and dealers from Portable Microsystems of Breckley, Northants. Costing \$595 plus VAT for a single drive, a controller and a power supply, this system is compatible with, and complements, the AIMEM 32K-byte add-on memory system.

## The Total Refresh Graphics System



Terminal Display Systems Ltd

tds

tds

## A growing monster that is devouring its dealer

DESPITE the fact that technology is wonderful, and microelectronics and the microprocessor have all but reached the level of deity, something is rotten in the state of micro-computerland. The all-powerful, all-purpose microgod seems to have created a monster that is small, as yet, but growing by leaps and bounds and devouring much of what comes in its way.

The monster is not hard to see. The market potential of the Pets, Apples, TRS-80s, Cromemcos et al, even in the most obvious sector of small business systems, is little short of remarkable. It has the capability to grow like Topsy. But in growing, it is showing a marked tendency to devour those that helped bring it into the world in the first place — the microcomputer retailers and dealers.

Two well-known names have already succumbed since December, and even though both companies have been saved, there will almost certainly be more going under before the year is out. But something can be done to save them, something no doubt unpopular with the users, but probably essential for the long-term survival of the chain of supply and support.

That something is to start seriously considering pushing the prices of microcomputer systems UP, not down. It is time to start educating the potential customer to expect to pay much more for a system than the current crop of advertisements might suggest.

Although it was widely heeded, a year or two ago, that microelectronics would force down the price of computing power to the point where micro systems would be used by everybody, these bright visions have not come to pass. Nevertheless, microcomputer systems have been taken up enthusiastically by small businessmen and the professions, who have clearly seen the advantages that can be gained from using computers. The cost of the system was the only obstacle, and microelectronics has solved that.

But, in solving the cost problem, the microcomputer supply industry has taken things too far, and fallen foul of its own marketing gambits. The low cost of the systems being sold is now creating major problems for the supply industry, especially the companies that provide the front end of the marketing chain — the dealers.

One reason for this is that microcomputer systems, by their very nature, cannot be merchandised like washing machines or hi-fi equipment. Neither can they be sold purely on the low cost of the hardware. Yet this is what has been happening, and it is this that has prompted the current situation in which any number of dealers could go to the wall this year.

The popular marketing platform that produces equipment adverts saying such things as "here is a box that can solve all your problems for under £500" does no-one any favours, least of all the dealers and users. The users especially, unless they actually understand computers, are more than liable to believe such an advert, rush out and buy a computer, sit it on a desk, key-in "GO" and wait for the miracle to happen.

When the inevitable happens, and the miracle doesn't, that user will be rushing huck whence he bought the "box". He will say to the dealer "Make it solve my problem", and the dealer will reply "Certainly, sir, that will cost you another £3,000."

So there is an urgent need for the marketing platform of microcomputer systems to be changed. The all-pervasive nature of their application, however, does mean that a merchandising style of marketing and sale is necessary. That style revolves around the use of distributors and dealers to present the manufacturer's wares to the market, and to support the users in making the best of them.

The distributors and dealers are necessary for the simple reason that no manufacturer would have the capability to support the needs of individual users by itself. It needs the distributors and dealers to share that load.

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This leads to two disillusioned groups of people. The customer is disillusioned because he has been "educated" in terms of a £500 outlay, and is now being told that the best part of £3,000 needs to be spent. The dealers are disillusioned because they are always put on the defensive by the marketing gimmick. This can be doubly galling if they have tried to point out the customer's mistake before the sale.

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There is a strong argument for raising system prices to prevent more dealers being forced out of business during the rest of this year.

Given that the largest market sector for microcomputer systems at the moment is in the occupational areas of small business and the professions, there is also scope for the development of another part to this new marketing platform. It is a part aimed at helping potential users actually understand what they are becoming involved with, and might be termed pre-sales support.

What this would be aimed at is the vast majority of potential users who do not understand computers and as such do not want to. All they want is an operable solution to their particular problem. But it is usually the case that the people running a small business, though they know a great deal about the product or service that forms the basis of that business, know very little about the utility of a microcomputer as a business administration where a microcomputer can be of most immediate benefit.

£3,000 per system, yet that is the minimum level of support a customer should expect from a dealer. It is a service that should be followed by after-sales hardware and software support and advice, much of which is often given free, even if formal support contracts exist.

The other factor is the growth of the market itself. If at least half of the dealer's margin goes into financing the purchase of next month's growth, month in and month out, then the cost of customer support and handling has to be borne out of the remainder of the margin, along with all the other costs of running a business.

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## by Martin Banks

When he left the post as Computer Weekly's Micro News editor, Martin Banks took a last look around the industry. Banks, who is now with the Mackintosh consultancy group, posed the question: Should the prices of micro systems be pushed up to ensure the survival of dealer networks?

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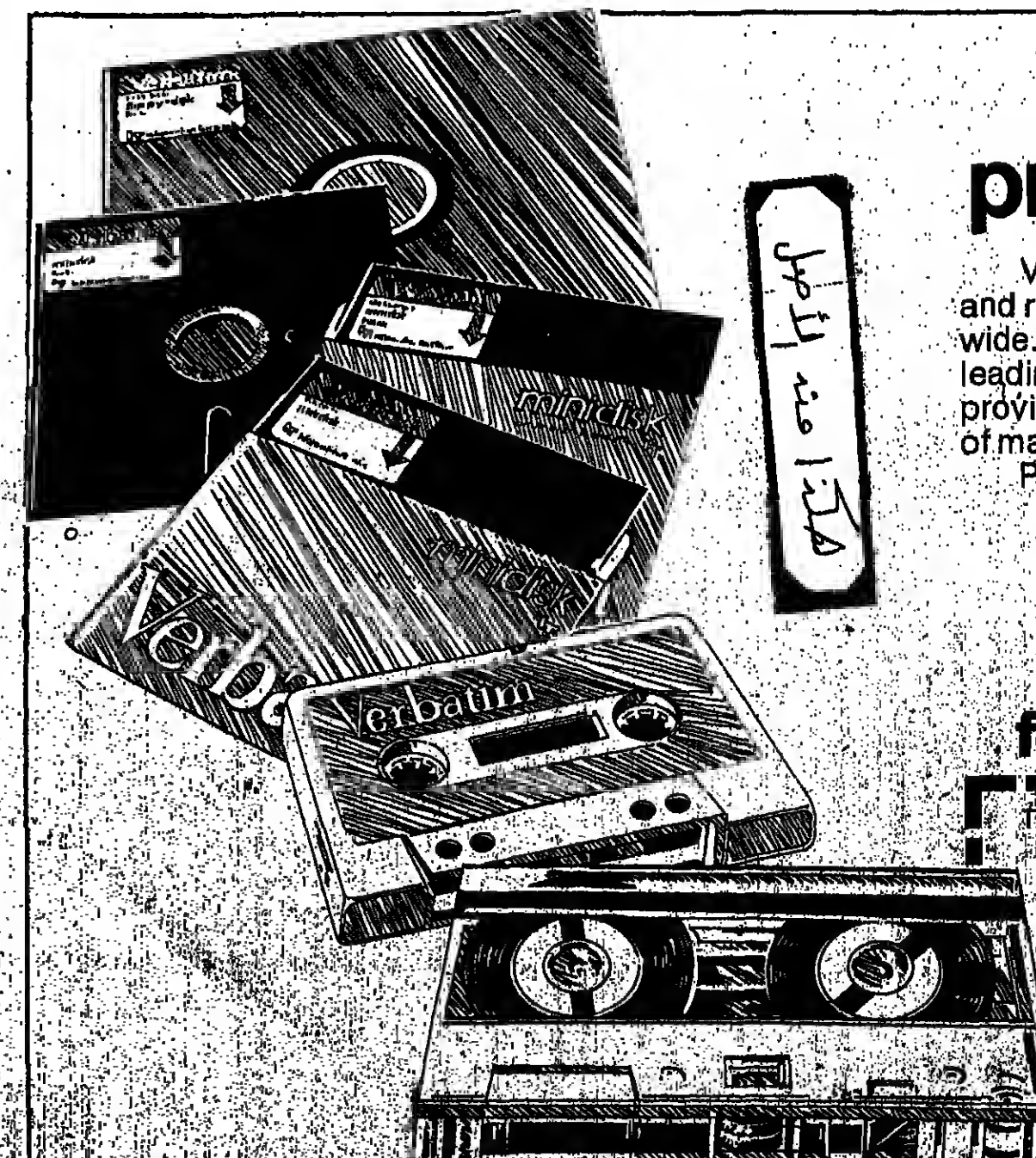
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## COMMUNICATIONS 80

# First public airing in UK for System X network

THE Post Office's planned digital network System X, got its first UK public airing at Communications 80 in Birmingham and the voice guidance feature it uses to make sure subscribers understand the available facilities and use them accurately proved itself well suited to public demonstration as well.

Keying or dialling the code for the call diversion service elicits a response which prompts the user to enter the number to which calls are to be diverted, and completion of the process is confirmed by the message: "Calls are being diverted to 2314." Messages are assembled by the exchange from a vocabulary of 200 recorded words.

Call diversion and abbreviated dialling are the first services which will be offered from System X exchanges, starting with Woodbridge in Suffolk at the end of this year. The Post Office will shortly enter discussions with the Post Office Users' National Council and other interested parties on whether to offer customers the benefits of being attached to a System X exchange for an extra charge. This is thought to be the only

satisfactory way of deciding connection priorities.

The Post Office also revealed some of its thinking on future services, with displays on digital local lines, visual services and optical fibre systems.

A scheme is being developed for compressing a moving television picture signal into two megabits per second and using a circuit which normally carries 30 telephone channels.

A joint project with the UK, France and Germany aims to test the feasibility of such transmission over the Orbital Test Satellite this autumn. Under the EEC's Co-operation On Science and Technology project 211, the three partners are developing a code which will combine special filtering and predictive coding with a method of detecting changes between one frame and the next to construct moving pictures from as little transmitted information as possible.

Work is also being done on switching signals sent at two megabits per second, rather than just multiplexing them as is done at present. The Post Office already provides trial facilities

for cable television distribution as part of its experiments on visual services networks, with the possibility of their forming part of a community wideband system with other applications.

The Post Office feels that an essential prelude to the offering of advanced services is international acceptance of the concept of the Integrated Services Digital Network. This means designing all switching and transmission equipment so that as far as possible it can support any service that uses a bit-stream.

## IBM letter carrier extended

AFTER 18 months' internal use, IBM has made its electronic mail system available to users running TCAM under VSI or MVS on 370 or 303X systems and having a 3750 or 1750 PABX.

In the first eight months of its internal trial between locations in the UK and the US, the company found that traffic increased from 70 to 700 letters a week. Now the system is to be extended to all European headquarters and the program licence will be available in the UK, France, Germany, Italy and Belgium.

The system, called Electronic Document Distribution, handles text communication between IBM magnetic card typewriters, and these were used to demonstrate it at Communications 80. Letters can also be sent to the 6640 Ink-Jet printer and further plans are to make the system available on all IBM processors and to add support for other terminal equipment, such as the 280,000 Intelligent Capiex or Document Distribution System.

Setting up a terminal involves inserting magnetic card copies of letters to be collected into the terminal hopper behind a "send" header card, followed by a stack of blank cards behind a "receive" header card.

The system then tails each terminal in turn to collect the mail before sorting and redistributing it. This is designed to take place at night for greatest economy of system use and line charges, but an "urgent" mode also allows mail to be collected once an hour during the day.

After discussions with other European PTTs, the Post Office reports that acceptance of the concept is good and standards for various parts of the scheme can be expected this year.

Plans for electronic mail were on display. A trial is to start later this year involving 160 terminals in a small number of large companies providing a store-and-forward message service using automatic transmission at off-peak call charge rates. Customer terminals are to be based on the Racal-ESL communications controller running Telepost Systems file management software.

A national public service is to follow next year, becoming international in 1982 when several countries plan to have Telex text services running in accordance with standards expected to be recommended by CCITT later this year.

## PO approval eagerly awaited for small Canadian PABXs

MANY frustrated business customers are thought to be anxiously waiting for the Post Office approval to be given to the pair of products which Canadian company Mitel had on its stand: two small PABXs.

The Superswitch SX-200 has 208 ports which can be configured as 150 extensions and 29 exchange lines at a cost of £13,000 or less than £100 per extension, when other PABXs cost £400 and £500 per extension.

Approval has been given for offshore operation of the SX-200 and several are in service on all rigs. It also has approval for operation on leased lines, but not on the public network, although in Italy it has full PTT approval.

The smaller SX-20 can handle up to 72 extensions and eight exchange lines and costs £4,800. Designed particularly for small hotels, it uses CMOS logic and switching to bring the benefits of stored program control to small businesses. Maintenance is simplified because it uses only three main types of printed circuit board.

Approval problems are also experienced by those waiting to buy or sell telephones with advanced features: although the

expectation that the Post Office's monopoly on supply of subscriber apparatus will continue has led to a brisk trade.

Poul Wilkinson of Cryston Memory Products said that having sold over 300 Lambda Campophones in the year since he started importing them from Hong Kong, he had placed an order for a further 10,000. They sold at £150, he said, and could alone 100 12-digit numbers for abbreviated dialling, could repeat the last number dialed and contained a clock with three time zones and a stopwatch.

Since a Home Office ruling last October on mobile radiophones, Wilkinson said he had been selling a £1,000 briefcase telephone which could be used via Securicor's services, outside those areas where the Post Office offered a radiophone service and therefore applied its monopoly.

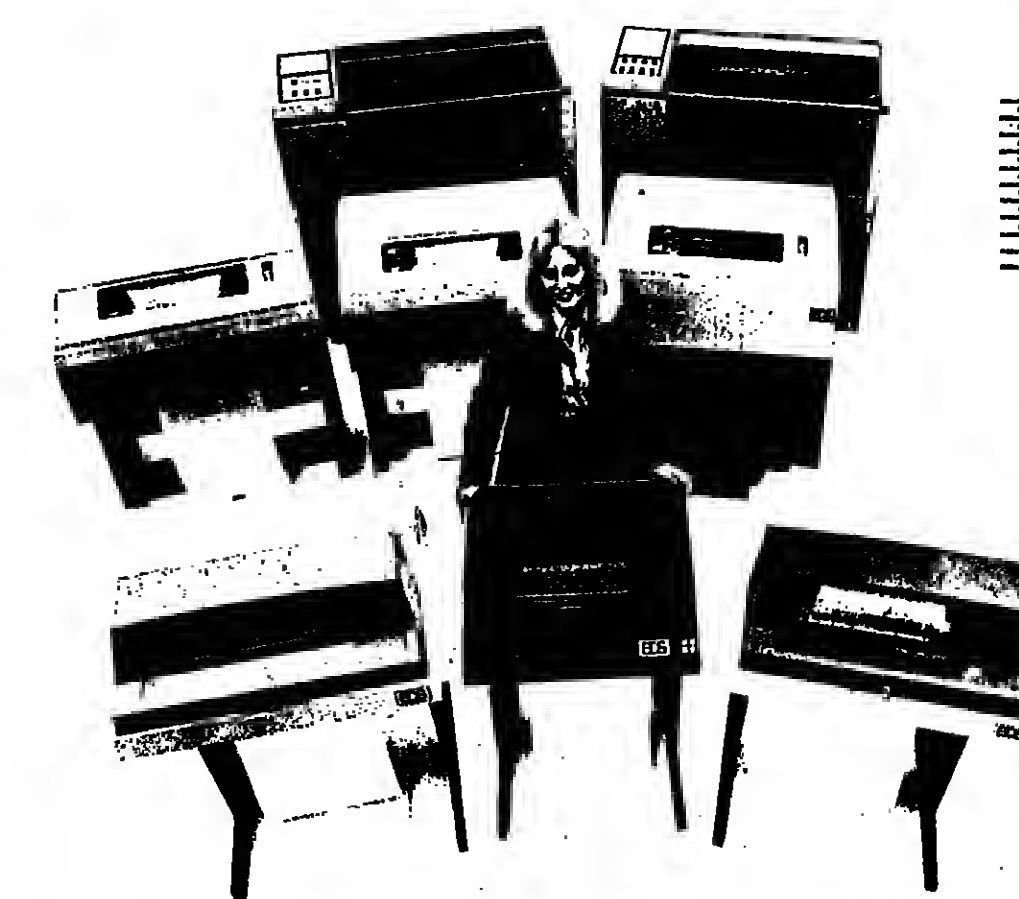
Cordless telephone handsets could not be imported or sold legally, because the Home Office would not grant a licence for the 27 MHz frequency they used, but he understood the Post Office expected to have one on the market by 1982. This might use the 46 MHz frequency, unless Home Office opinion changed.

Report by Donald Kennett



Elements showed for the first time in the UK the HP 2080 fax transceiver which has an ink-jet print head and is compatible with CCITT Group 2 standard for transmission in three minutes.

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# CTL bids for a share of information technology market

CTL, a share of the potentially rich information technology market. Computer Technology Ltd has been restructured and becomes one of the operating subsidiaries of a new group, Information Technology Ltd. Chief executive is Tony Davies, founder and driving force behind Montan, the highly successful automatic test equipment venture which was taken over by Schlumberger (CW, January 5, 1978).

Davies has taken a 10% share in the group and has a five-year option on a further 45%. This holding will come from the company's institutional shareholders. ITC, the Swiss-based Savanna Trust, Pergamon Press and Samuel Montagu. These hold 80% of CTL and Davies' acquisition will be on a pro rata basis for each. The remaining 10% of the group is held by employees.

In addition to Computer Technology, where Burt Finch



DAVIES... 10% share with option on a further 45%.

will continue as managing director, a new subsidiary, Office Technology Ltd, under Spud Taylor and based at Winchester, has been set up. Initially the group will depend

on established CTL operations for profits and cash but Davies sees CTL as only the first of several subsidiaries that will be formed to cover new markets.

The growth of the group, as projected by Davies, will be 50% a year for the next five years to reach a turnover of £50 million by 1985. Staff would increase over the same period from 380 to over 1,000, and plants and offices would also be expanded.

The aim of the group is to develop workstations for "principals". These are described as units for use by executives, professionals, administrators and clerical staff, as opposed to the more usual word processors used by secretarial staff.

However, the first product planned for CTL will be a word processor due to be launched next year. This is based on research work done by a team of former IBM designers who have been brought together from the UK and the US.

## BOC names new chief

NEW chief executive of BOC Computer Services is Colin Southgate, formerly chief executive of Software Science which was taken over by BOC 18 months ago (CW, December 7, 1978). Southgate takes the reins from Brian Mills who has left the group to set up his own financial and investment service for the computer industry. Under his guidance BOC computer operations grew to one of the biggest UK service organisations with a turnover of £40 million a year.

## NEB to sell stake in Ferranti by end of June

THE National Enterprise Board intends to sell its stake in Ferranti by the end of June, but has not yet decided on the details of how this will be done. Company staff are concerned that it should keep its independence after the sale, and so are pressing for it not to be sold to a single bidder.

To avoid the possibility of a takeover, a large share could be sold to an institution.

## Unilever Computer Services celebrates 10 years of growth

TEN years of growth and expansion are being celebrated by Unilever Computer Services Ltd, the computer subsidiary of the Unilever foods and soap conglomerate.

Set up in 1970 by merging three in-house operations run by Unilever companies, UCSL now has centres in Burgess Hill, Sussex, and at Watford, using Nasco AS5s, and a third centre at Norwich where IBM 380 kit is soon to be replaced by 4300 systems. A fourth centre due to open on Merseyside later this year will have an AS5.

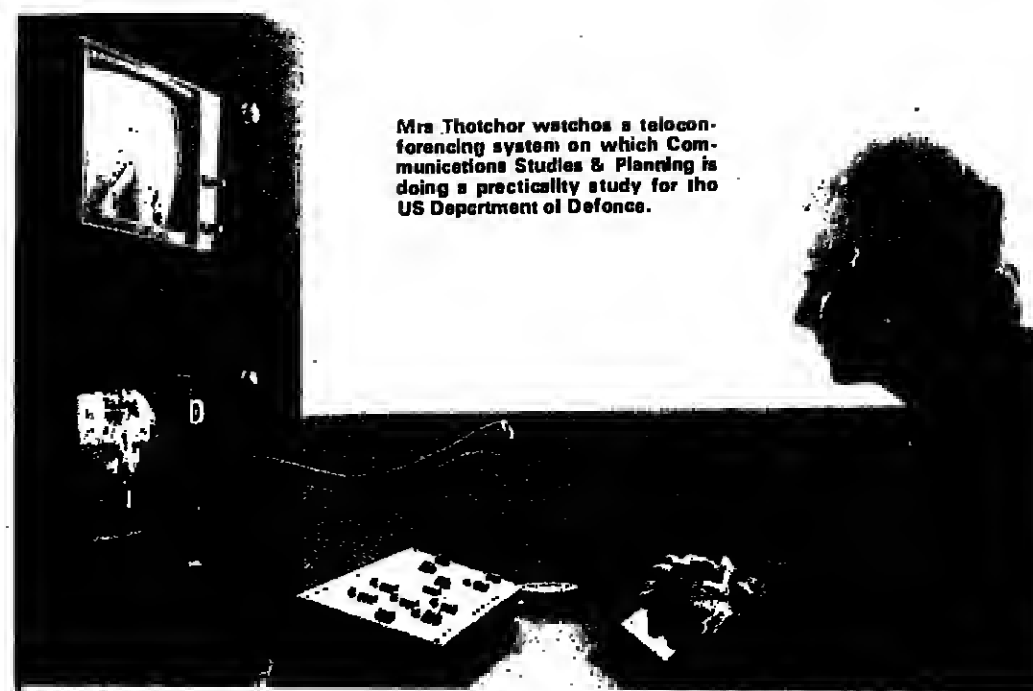
There is also a microfiche service in the City and UCSL has a third share and is responsible for managing Tymshare UK, the British end of the US time sharing and information network.

Reviewing progress, chairman Len Rawle, who was responsible for getting UCSL off the ground, said that from the start they had been in the open market, having to bid for Unilever work as well

as that from other clients, and these now accounted for 64% of the business. First profit had been shown in 1972, a year ahead of plan, and over the five years 1975 to 1979 turnover had increased from £3.4 million to £12.3 million, with before tax profits rising from £500,000 to £1.25 million.

Data services accounted for 65% of turnover and within the division specialised services were offered for accountancy, insurance and pensions, engineering and text processing.

One of the latest ventures was UCSL Microsystems which had introduced a range of micro-based hand-held terminals which could be tailored for a number of applications. The M88 was the company's first completely in-house designed and developed unit and Rawle saw expansion in this field and the provision of wider communications based services as the growth path that UCSL would follow during the next decade.



Mrs Thatcher watches a teleconferencing system on which Communications Studies & Planning is doing a practical study for the US Department of Defence.

## Mrs T comes to terms with computers

IT is quite an achievement for an industry to grab the attention of the Prime Minister for a whole morning, but the computer business did just that when Mrs Thatcher visited software houses Logica and Communications Studies & Planning. The PM's enthusiasm for technology products in which Britain leads the world.

"We do a lot of this business, we're very good at it, and we're trying to compete," she asserted.

At Logica she had her first

glimpse of Prostat, eagerly studying the graphical displays of the growth of the money supply.

She lost her patience watching a "missionaries and cannibals" game, though, finally asking "Why can't we shoot a cannibal?"

The Prime Minister was most impressed by Logica's image processor for colour satellite pictures, which she said would be useful for watching crop diseases, and for defence. The new 2200 word processor also

aroused her excitement, especially for rewriting speeches. She left Logica to a perfunctory applause from bystanders, a request for an autograph from a girl — and a chorus of tears and sobs from the Post Office workers in the sorting office yard across the road.

## Post Office changes to British Telecom

THE Post Office has started to use the name British Telecom for its telecommunications activities in preparation for the planned creation of a separate corporation by Act of Parliament.

Managing director Peter Benton said that the new name and style would make it clear that the business had been rejuvenated whilst the new management structure pursued its eight-point plan to improve services.

The plan includes a radical reform of buying and distribution procedures to reduce delays and plant renewal in local network troublespots, using new jointing techniques to prevent

deterioration and optical fibres where ducts were overcrowded. New computer-based measurement and analysis centres aimed at spotting faults as they occur are to be introduced at the rate of three a month until every exchange with over 1,000 lines has one.

By the end of the year 80 TKE4 electronic exchanges will have been added to the 60 already in service.

This plan calls for an investment of £1,500 million a year, which Benton says is clearly close to a minimum when compared with the French plan to invest £2,500 million a year.

## ICL plans experimental retail selling exercise

ICL is reviewing its marketing methods, and is planning an experimental retail selling exercise. This was revealed to ICL users by Doug Comish, ICL marketing director, at the ICL CUA conference at Eastbourne.

Comish was stressing ICL's intent "to compete strongly in markets for smaller products used by non-specialists". He anticipated that customers for these products would wish to order equipment by catalogue, or by going to a retail outlet, hence the planned experiment.

Comish also revealed that ICL was doing a lot of research work into speech-response systems,

and said it had developed a method of storing compactly vocabularies of several hundred words.

ICL managing director Chris Wilson, made a strong appeal for reality in government and EEC policies towards local supplier preference. He stressed the need to ensure an adequate supply of the two most important resources, energy and computer systems.

He then pointed out that the proportion of US owned companies operating in Europe was now 82 per cent, and predicted that "the Japanese invasion cannot be long delayed".

## Plato training centres

FOUR training centres have been opened in the UK by Control Data to enable people to use the Plato learning system, without having to acquire their own terminals. Centres are in London, Bristol, Manchester, and Birmingham, using dedicated Cyber 730 in East Barnet.

Users will pay about £7 to £10 an hour for training, part of which uses CDC's high resolution intelligent VDU, and part of which is in printed form. Four

courses are currently offered, in microelectronics, selling, supervisory skills, and career development.

Systems house Logica is thinking of using Plato to train staff for its projected word processor factory in Swindon.

The London centre was officially opened by Industry Secretary Sir Keith Joseph, who commented, "The idea does not seem to be that new technology destroys jobs."

## Data General launches long-awaited 32-bit machine

THE long-awaited 32-bit machine from Data General has now been launched as the MV/8000. It can run programs developed under ACIS on 16-bit Data General machines without modification.

Data General emphasises the high degree of compatibility between the MV/8000 and existing 16-bit Eclipse machines and points out that this compatibility provides the user with a broad range of scientific and commercial software. The MV/8000 looks like being promoted much more heavily in the commercial sector than existing 32-bit "super" minicomputers.

The main software offering with the MV/8000 is the ACIS/V5 operating system which, according to Data General, takes advantage of the machine's architecture in managing system resources for up to 128 users each accessing up to 512 megabytes of logical address space.

Three different processors are included in the MV/8000, with the option of a fourth, a Nova, as communications processor. The arithmetic-logic unit is a 32-bit

processor using AMD 2901 series bit-slice microprocessors and programmable array logic in the peripheral circuitry. It has a 16K-byte data cache and a 1K instruction cache, and uses a four-stage pipeline.

The other processors are a 64K-byte Eclipse used as the input-output and a Micronova used as the system control processor.

## Harris offers micro-based information processing family

EXTENDING its equipment line more firmly into information processing, Harris Systems has introduced the microprocessor-based 9200 family.

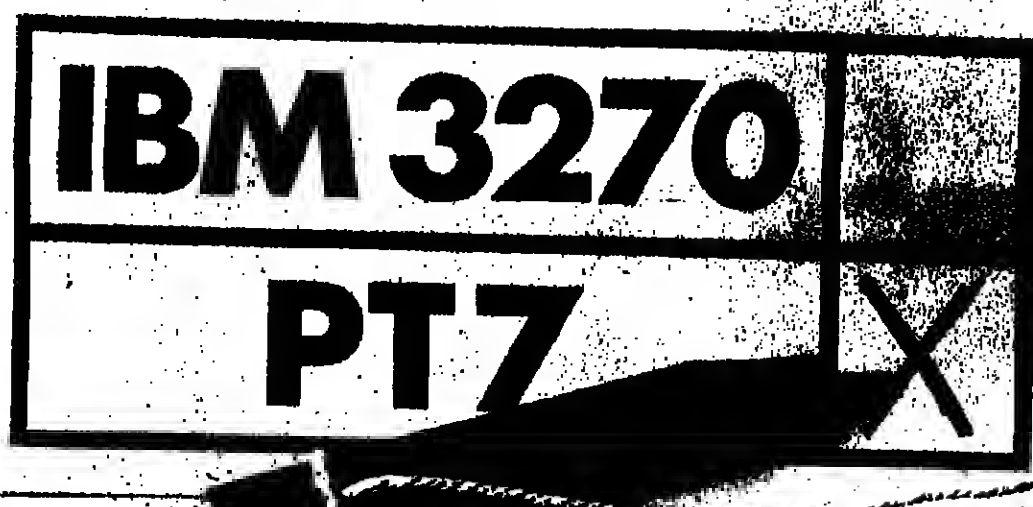
Designed to be compatible with IBM's 3270s and to replace the 8100s taken over from Sanders Data Systems (CW, February 17, 1977), the first 9200 model, the 9210, is scheduled for delivery in September. The first UK order, placed by a company in the north of England, is for four 9210 controllers supporting 54 displays.

The instruction set is a super-set of that in the Eclipse and 16- and 32-bit programs can be executed concurrently. New 32-bit Assembler language compilers for Fortran 77 and PL-1 feature common code generator and optimiser enabling subroutines to be shared between programs using either language. A new 32-bit Basic is also offered.

First introduced in Europe at Hannover Fair, and making its US debut at the National Computer Conference at Anaheim, California, the 9200 incorporates the Intel 8086 and up to six can be loaded into each controller giving a 2 Mbyte memory capacity and the capability to support up to 32 devices.

The 9200s have been designed to enter the market 10% to 15% below IBM prices and a basic system with four VDUs and a printer would cost about £12,000.

YOU HAVE A CHOICE.



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Using an IBM mainframe? Thinking about a new terminal?

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The Ferranti PT7. It offers 3270 facilities and more.

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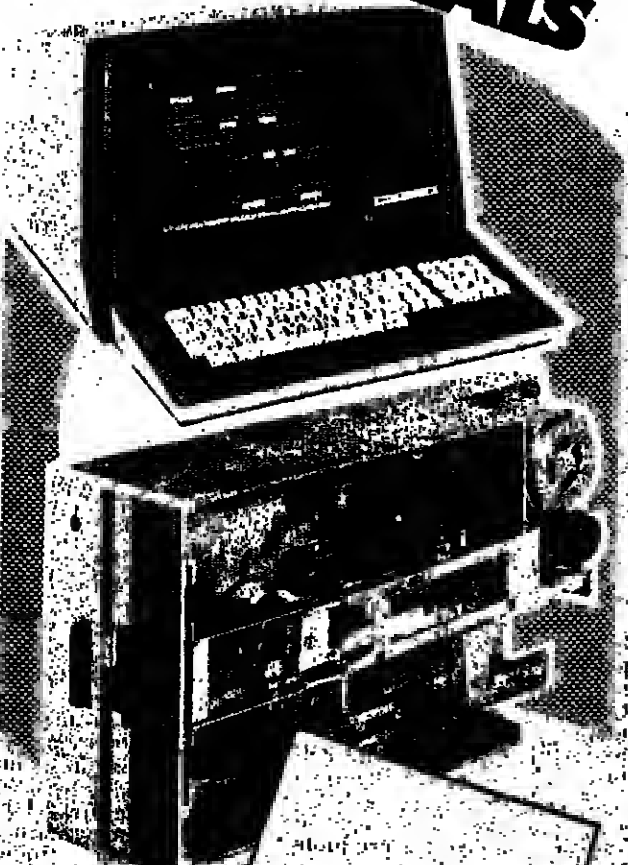
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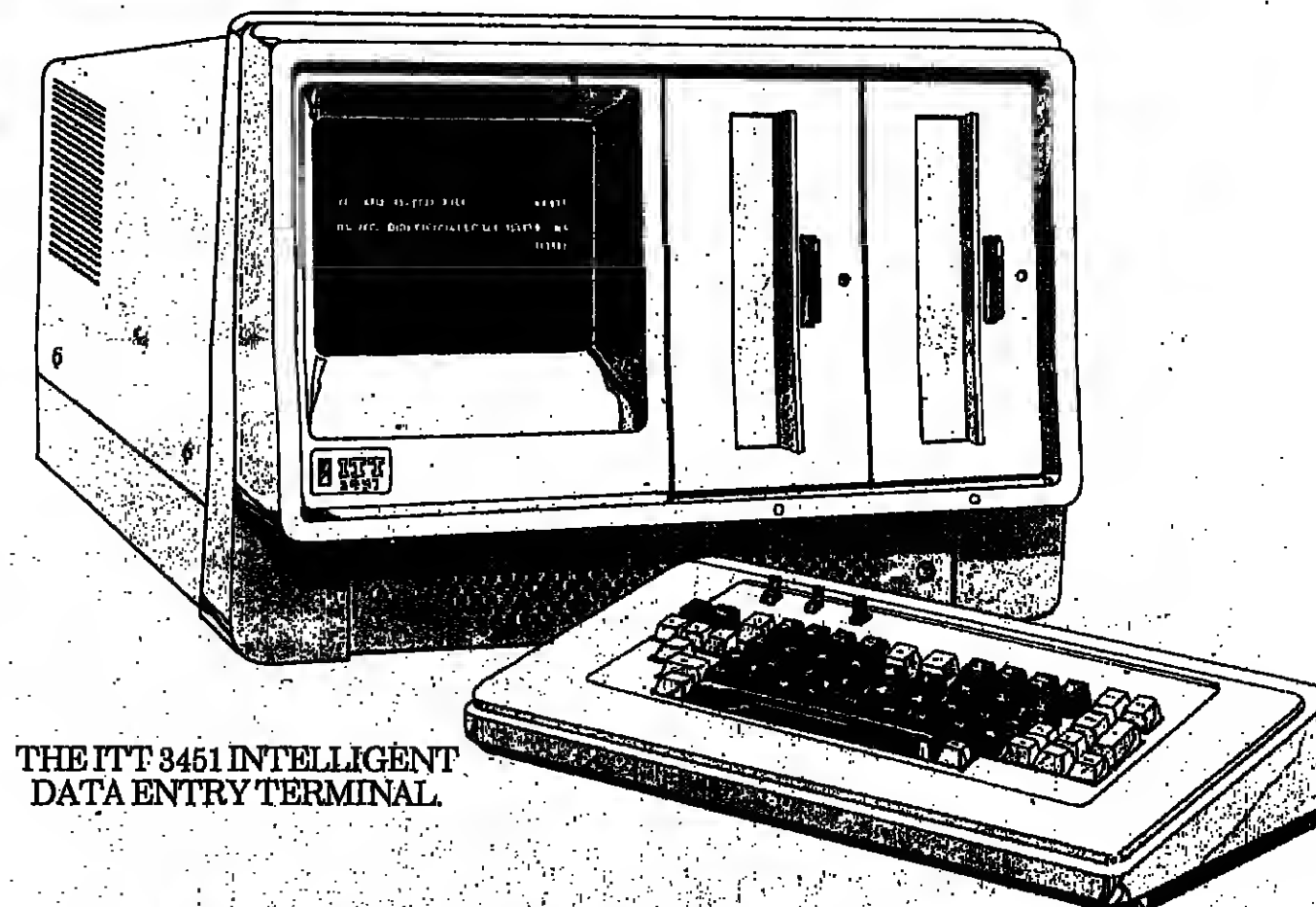
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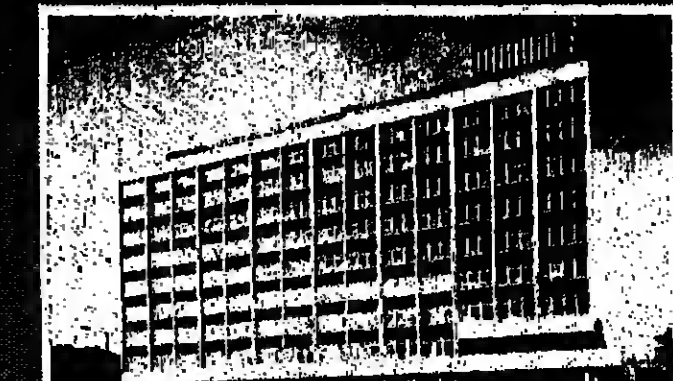
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## HANOVER FAIR

# A window on the Comecon countries

HANOVER FAIR provides one of the few opportunities for Western observers to catch up with what is happening in Eastern Europe, as most of the Comecon countries, apart from the Soviet Union, exhibit in the computer hall. This year, Robotron of East Germany and Videoton of Hungary reported significant advances.

The latest microprocessor from Kombinat Elektronik, the East German chip factory (CW, March 20) appears to be a bit-slice micro 8 bits wide. Although the U880 is based on the Intel 8080 and Z80 micros, the U880 appears to be an original design not based on any existing US product. It includes arithmetic logic unit, eight registers and status flags, and two are used in Robotron's new K1820 minicomputer which features a new set of 400 instructions, incompatible with the previous Robotron 4000 series of minicomputers. It is unclear whether it is compatible with the new Rjad unified range of minis, which is similar to the PDP-11 line.

At Hanover it was exhibited as a system called A8401, featuring an additional chip for floating point arithmetic. Also on show was a synthesised voice system based on programmed memory chips.

Robotron is also talking of putting four U880s together to make a 32-bit processor. Theoretically this could be made compatible with the Rjad-2 line of minisframes which is based on IBM's System 370 line, but it is unclear whether this is in the Robotron plan.

The other new processor alongside the K1820 is the K1820, based on the U880 eight-bit microprocessor. This is claimed to have an internal cycle of 420 nanoseconds, and like the Z80 addresses up to 64K-bytes.

Among the products based on the processor is an A8201 accounting machine, which comes with either the Robotron 40-chips daisywheel printer or a tabling matrix printer running at 180 cps. Text processing software is in development. The array of peripherals supported includes up to four floppy disc drives, one printer, two tape cassettes and a display. First shipments are not due until the end of the year, and in East Germany such target dates tend not to be met.

The same processor plus peripheral controller is used in the A8203 data entry terminal.

Over at Videoton, the Hungarian company was displaying examples from its enormous range of VDT 52000 series display terminals, which are based on the Intel 8080. Versions are offered with integral floppy discs, integral cassettes, and with IBM 3275 and Siemens Transdata compatibility.

The standards for Teletex have not yet been set — the CCITT is due to do this late this year — so the Germans have worked out provisional standards of their own.

Philips was demonstrating this using a BTS minicomputer to interface its existing P8002 word processors to the Bundespost network and a switching computer in Munich. An A4 page could be transmitted in seven seconds. Philips is developing a purpose-designed Teletex terminal which it expects to sell in hundreds to the Swedish Post Office over the next few years. The Swedes are thinking about setting up a whole new network for Teletex in their own country.

SEL also had a prototype Teletex terminal on its stand

## Successful East-West collaboration

THE most successful East-West computer collaboration is that between the Hungarian company Videoton and CII of France, and its successor SEMS.

Videoton is building the full current line of SEMS Mitra minis. The Mitra 118 is built as the VT 60, the Mitra 225 as the VT 80, and the new Mitra 528 as the VT 6000. This last machine uses the high-speed Motorola 10800 four-bit bit-slice micro-processor as the basis of the CPU.

The VT 6000 appeared at Hanover last year a few days before it was even announced by SEMS as the Mitra 225 in France, and is now in series production in Hungary. Series production of the VT 6000 begins next year.

Videoton is building about 25 processors a month and its minicomputer business is worth about 1,500 million Forints, which has a nominal commercial value of £20 million.

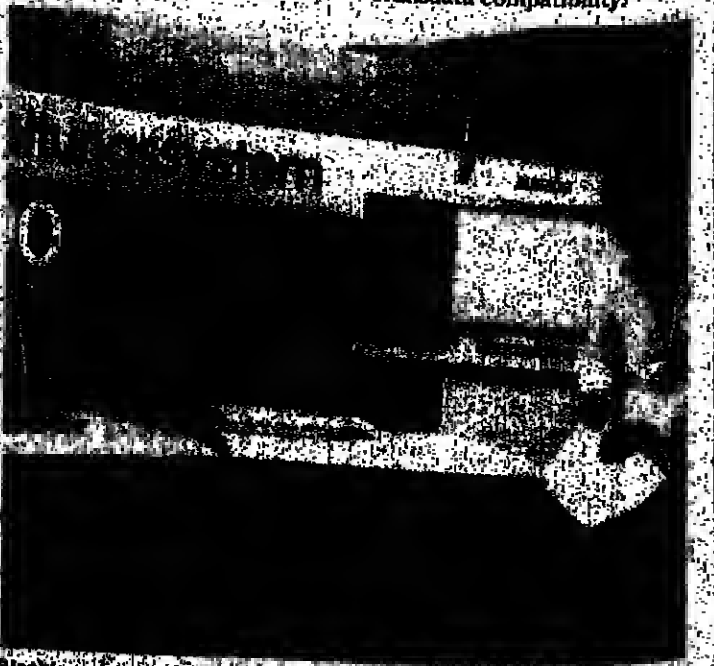
which marks a dramatic advance in Robotron styling, being a very attractive-looking keyboard display station with built-in floppy.

Language available on the K1520 — which is also offered as a microcomputer in its own right, capable of supporting three further slave K1520s — is Intel-compatible assembler, while a Basic compiler is due shortly and a mini-Cobol is planned for next year.

The new products are being offered to the existing Videoton agents in the West, which have been successful with the Robotron/Daro VRCs.

The key question about the new Robotron products is that of the yields that Kombinat Elektronik is getting on its microprocessors and memory chips. Although these are not likely to be high, the volumes of products produced in Robotron factories are sufficiently small that low yields are not likely to be a limiting factor, provided they are above sample quantities.

At Videoton, the Hungarian company was displaying examples from its enormous range of VDT 52000 series display terminals, which are based on the Intel 8080. Versions are offered with integral floppy discs, integral cassettes, and with IBM 3275 and Siemens Transdata compatibility.



# Japan steals a march on Western products

"THE Japanese invasion" — that was the overwhelming impression visitors had of Hanover Fair, where over 40 companies from the Far East were exhibiting not just new products for office systems, but new technology. Instead of simply copying Western products, the Japanese are introducing equipment well in advance of anything currently available elsewhere.

Prototype machines on display and working included several intelligent copiers (xerographic printer-copiers that can be used for fast, high-quality word processing output), a colour facsimile machine, a true electronic copier in which there is no optical, only electrical, connection between the read and write mechanisms, and a high-resolution full-page display screen. Ink jet technology has been advanced enough to be used in a two-colour copier and in a high-resolution printer capable of generating Japanese characters.

None of these machines is yet on the market but most will be by the end of 1980, presenting Western component manufacturers with serious problems over how to keep up. As far as printer-copiers go, only two are currently available: IBM's is very big and expensive and there have been widespread problems in getting Wang's on to the market. It was not even on show at Hanover this year. In contrast, one of the Japanese machines is small and simple enough to be a desk-top unit.

Not many new end-user word processing products were to be seen at Hanover, but those that were, were important. Nexos unveiled an upgraded version of its stand-alone word processor, designed for use by secretaries, not just typists, and based on a 16-bit micro to give improved performance and plenty of capacity for expanded facilities. Nixdorf had a machine that can be either stand-alone or shared logic, and discussed plans for integrating WP into its office data processing systems. Sony revealed that it will be announcing a word processing product later this year, without giving any further details.

Triumph-Adler has entered the low end of the word processing market with this electronic typewriter, the BE1010, using a daisy wheel printer.



## Impressive line-up

THE detailed line-up of revolutionary Japanese products was this:

● Ricoh demonstrated an electronic printer-copier with separate read and write engines. In effect a high-speed, high-quality facsimile system. This was capable of combining images from a scanning station with text from a word processor on to the same output document. The images could be held in a buffer store, and even be moved about on the paper, according to a program by which co-ordinates were specified. Enlarging and reducing of image size is not yet available, but is to be incorporated in future models. The printing was done by laser scanning on to a xerographic drum.

● Ricoh also had a two-colour copier, capable of differentiating between red and black, which used ink-jet rather than xerography to produce its output.

● U-Bix showed a printer-copier and a printer-only, using xerography but with optical fibre tubes rather than lens to generate the image. Character size can be enlarged or condensed electronically. These were newer developments than the U-Bix copier on which Wang's Image Printer is based.

● Penosonic demonstrated a full-colour facsimile system which took two minutes to transmit an A4 page. This also used ink-jet recording, with four colours of ink: red, yellow, blue and black.

● Canon released details of a laser printer small enough to fit on a desk, which can therefore be expected to have an appropriately low price. This was developed at Canon's Advanced Technology Department in New York State.

● Mitsui's high-resolution screen displayed 98 characters horizontally by 84 vertically, all on a 15-inch tube. Each character was a 7 by 9 dot matrix, allowing for subscript and superscript. A slightly larger screen with the same performance would be attractive for word processors.

● Sharp showed examples of output from an ink-jet printer, developed for Japanese word processors, which uses a 24-square dot matrix to reproduce Japanese characters attractively. The character generator can hold 2,800 different symbols, enough for 99% of Japanese writing.

## Teletext on show

ATTENTION was diverted back to the European scene for a demonstration of Teletex by the German Bundespost in conjunction with several manufacturers: Philips, Siemens, Triumph-Adler, Standard Electric Lorenz, and Olympia. Teletex is a high-quality Telex service, providing such features as upper and lower case and store-and-forward in effect providing a packet-switched network of communicating word processors.

The standards for Teletex have not yet been set — the CCITT is due to do this late this year — so the Germans have worked out provisional standards of their own.

Philips was demonstrating this using a BTS minicomputer to interface its existing P8002 word processors to the Bundespost network and a switching computer in Munich. An A4 page could be transmitted in seven seconds. Philips is developing a purpose-designed Teletex terminal which it expects to sell in hundreds to the Swedish Post Office over the next few years. The Swedes are thinking about setting up a whole new network for Teletex in their own country.

This represents a significant new venture for SEL, which has not hitherto been involved in word processing. Development work has been going on within SEL's parent, ITT, for a while now, and experienced staff, such as Logitek's former head of word processing development, John Parnall, have been taken on board.

Word processing is one of the options available on Philips' new P8000 personal computer. Plus in ROMs convert the machine alternately into a WP, a computer with Basic or Pascal, a viewpoint terminal, or a games playing device. An optional VDU with mini-floppy discs sits above the keyboard on a frame; without this the programs can be stored on minicassettes, the drive for which is built into the basic unit. Prices range from about £500 to over £2,000.

The new Nexos word processor is called the 2200, and like its predecessor the VTS-100 is built by Logitek. However, the specification came from Nexos, whereas the VTS-100 existed before the new firm was founded in 1979. Much of the software is the same, but the new machine is based on the Intel 80286-bit micro, allowing up to 256K-bytes of store. The basic 2200 will have 128K-bytes.

Reports by Tim Palmer and Rory Johnston



The housing of the Nexos 2200 word processor has been designed to fit unobtrusively on a secretary's desk, so it can be used as a future office system work station.

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## ADVANCED FILE DESIGN—Part 9

by Owen Hanson and Norman Revell

# Improvement and optimisation

SOFTWARE provided by manufacturers is aimed at meeting the needs of a very wide spectrum of users. This leads to a general approach to any given problem; the specific requirements of any one application could be handled more efficiently in some other way, at the expense of other users. This has led to the identification of a number of weaknesses in manufacturers' software that have been remedied by independent software sources.

Because it is very widely used, ISAM has been the subject of most improvement. The weaknesses in ISAM can be summarised as the use of too much space, and loss of time. The reasons are as follows:

## Space

1. Records are unblocked in overflow areas, which means that the file requires more direct access space than if records were blocked.

2. Large user keys may be appropriate for a particular application, but this will increase the size of the indices, allowing less room for data storage.

3. Applications requiring both sequential and direct reference will need two separate ISAM modules in main storage. This can use up to 47K, and may limit the space available to the user program.

## Speed

4. Overflow records require longer retrieval times than prime data records. This leads to the need for relatively frequent reorganisations to limit run times.

5. During sequential processing, a record may not be processed until the next record has passed the read/write heads. A complete disc revolution will be required before the record is available once more.

Various suppliers have provided software that improves on ISAM in one or more of these areas. The Amiga package provided by Contem (UK), focussed on points 1, 3 and 5. PSAM, marketed by Westinghouse Management Systems Division, concentrates on points 1 and 4 by handling additions in the prime data area. This is claimed to reduce disc I/O time in comparison with an ISAM file that has records in overflow.

It also implies that less frequent reorganisations are required, and less disc space is used because additions are held in blocked form. It is worth pointing out that ICL's 1900 series indexed sequential software does allow the user to specify a packing density for data in the prime data buckets, and so can avoid or drastically reduce the need for separate overflow areas by leaving free space in the data area of the file.

These instances of improved software can lead users to assume that it is always possible to improve on the performance of a given file. In many cases this is true, but it does not always hold. The user should first check the manufacturer's software has been fully optimised, using any options that are provided.

Coyte examined the performance of an ISAM file in detail, and implemented a series of measures that improved throughput by more than four times. This is shown in Diagram 1. He concluded that alternative suppliers did not offer a better solution for his application.

IBM decided to improve on ISAM, and developed VSAM, Virtual Sequential Access Method, which takes into account points 1, 2, 4 and 5. In addition, it allows the user to define files without considering the physical make-up of the direct access storage being used, and to transfer files between different OS/VS operating systems and from OS/VS to DOS/VS.

The structure of a VSAM file is shown in Diagram 2. In setting up such a file, a key-sequenced floor data set is created, with its associated indexes, as a cluster. For our purposes the cluster is an indexed file.

Data storage is divided into control intervals, which are continuous areas of storage of a size that is not necessarily related to the physical make-up of the device on which the data is stored. This is shown in Diagram 3. A control interval is the unit of data that is moved between virtual and backing storage. In a sense it is equivalent to a track in an ISAM file, in that there is one index entry per control interval.

A group of control intervals makes up a control area. The

whole of a control area is referenced by the entries in a single index record, and in a sense this is equivalent to a cylinder in ISAM terms.

Indices are arranged as follows. All the higher indices are collectively called the index set, and they are divided into index records containing a number of pointers. One of these pointers indicates the next index record at this level, and is used to move sequentially through the file.

The other pointers indicate the location of a number of index records at a lower level. The lowest level of index records makes up the sequence set, and in this case the pointers are to control intervals; the total number of control intervals indexed by one index record makes up a control area.

Additional to the file are catered for by the provision of distributed free space. This can be allocated by allowing a number of control intervals to remain entirely empty, by leaving space at the end of every control interval that contains data records, or by a combination of both techniques. As all the space available in a control area is allocated when the file is set up, VSAM provides the equivalent of a cylinder overflow area in ISAM, and a proportion of free space in data storage area, as used in ICL 1900 series software.

Records added to a file are blocked in just the same way as the original data, and not unblocked as in ISAM. VSAM does

8000 transactions/hour — Original throughput

• New records added in descending order

• Dummy records to handle future additions

12000

• Addition of a master index

16000

• Master index held in main storage

22000

• Cylinder index held in main storage

28000

• Binary search of in-core tables replaces manufacturers routine (user modification)

38000

Diagram 1. This illustrates a series of measures devised by F. T. Coyte to optimise throughput of an ISAM file.

not leave deleted records in the data area, as does ISAM. The area occupied by the record or part of a record that has been deleted is added to the distributed free space available.

When records are inserted, a control interval split takes place under VSAM control. If there is not sufficient space for the inserted records in the control interval, the user can reference a file in different sequences using a number of different keys. Alternate indices can be updated when records are added or deleted, by specifying UPGRADE in the alternate index definition. Keys in all VSAM indices are compressed, only the distinguishing parts of the keys being stored, in order to reduce the size of index entries.

These facilities make VSAM more similar to database software than most of the file organisation techniques that have been examined so far. In fact many of the database systems available for mini- and microcomputers provide only this multiple index facility.

VSAM can be optimised by careful design, applying the same principles that have been described earlier. The designer should look at the following factors:

1. The relation of data areas and index position to the physical characteristics of the device. The portability of a VSAM file from one device to another, and from operation under one OS/VS system to another, or from OS/VS to DOS/VS is helpful in providing rapid conversion.

However, for optimum performance the size of control intervals and control areas should be so arranged that a sequence set record will be stored on the same cylinder as the control area it indexes. This means that movement from, say, a 3330 to a 3380 will require the definition of new control areas unless the number of control areas on a

cylinder has been designed to take account of this change of disc in the future.

2. The size of the buffers provided for VSAM directly determines the number of higher index records held in virtual storage (as against backing storage). Hence buffers should be both as large as possible, and related in size to index record size.

3. Distribution of free space. The ability to define empty control intervals where they are required means that careful planning with a knowledge of the likely distribution of additions will reduce the need for control area splits, and possibly control interval splits. This will improve performance.

In conclusion it is worth pointing out that indexed sequential files are often taken for granted, because the manufacturers provide comprehensive software. Optimisation of this software can bring very substantial benefits. In some cases software from independent suppliers will be more available, because its design aims match the need of a given application. Professional file designers should be in a position to optimise manufacturers' software and decide when to try alternatives.

VSAM is a departure towards database software. In following parts we shall examine the development of this software, its advantages and pitfalls.

## REFERENCES

1. The Hidden Speed of ISAM, by F. T. Coyte, 'Datamation', June 1971, 48-49.

## BASIC FILE DESIGN

A new impression of Basic File Design is now available and copies may be ordered from the General Sales Manager, IFE Electrical and Electronic Press Ltd, Dorset House, Stamford Street, London SE1 8LU, Price £1.90 each including postage.

## Expert systems group meeting

THE British Computer Society has formed a Specialist Group in Expert Systems, and its first meeting has been organised under the heading Expert Systems: Practical Applications of Knowledge Engineering.

The meeting is jointly sponsored by the BCS Information Retrieval Specialist Group and will include a paper by Professor Donald Michie on expert systems and the industrial future. Professor Michie is head of the Machine Intelligence Research Unit at Edinburgh University. John Fildes of the MRC Social and Applied Psychology Unit at Sheffield University will give a

paper entitled The Expert Clinical Assistant: a case study, and expert systems in management decision making will be the subject of Bernard Kelly of ICL. John Rafter, also of the Machine Intelligence Unit at Edinburgh, will speak on the inference net for diagnosing oil platform faults.

The meeting will take place at Imperial College, London on June 27 at 11 am. The registration fee £20 includes one year's membership of the group. It should be sent to Dr Keith Clark, Dept of Computing and Control, Imperial College, 180 Queen's Gate, London SW7 2BZ.

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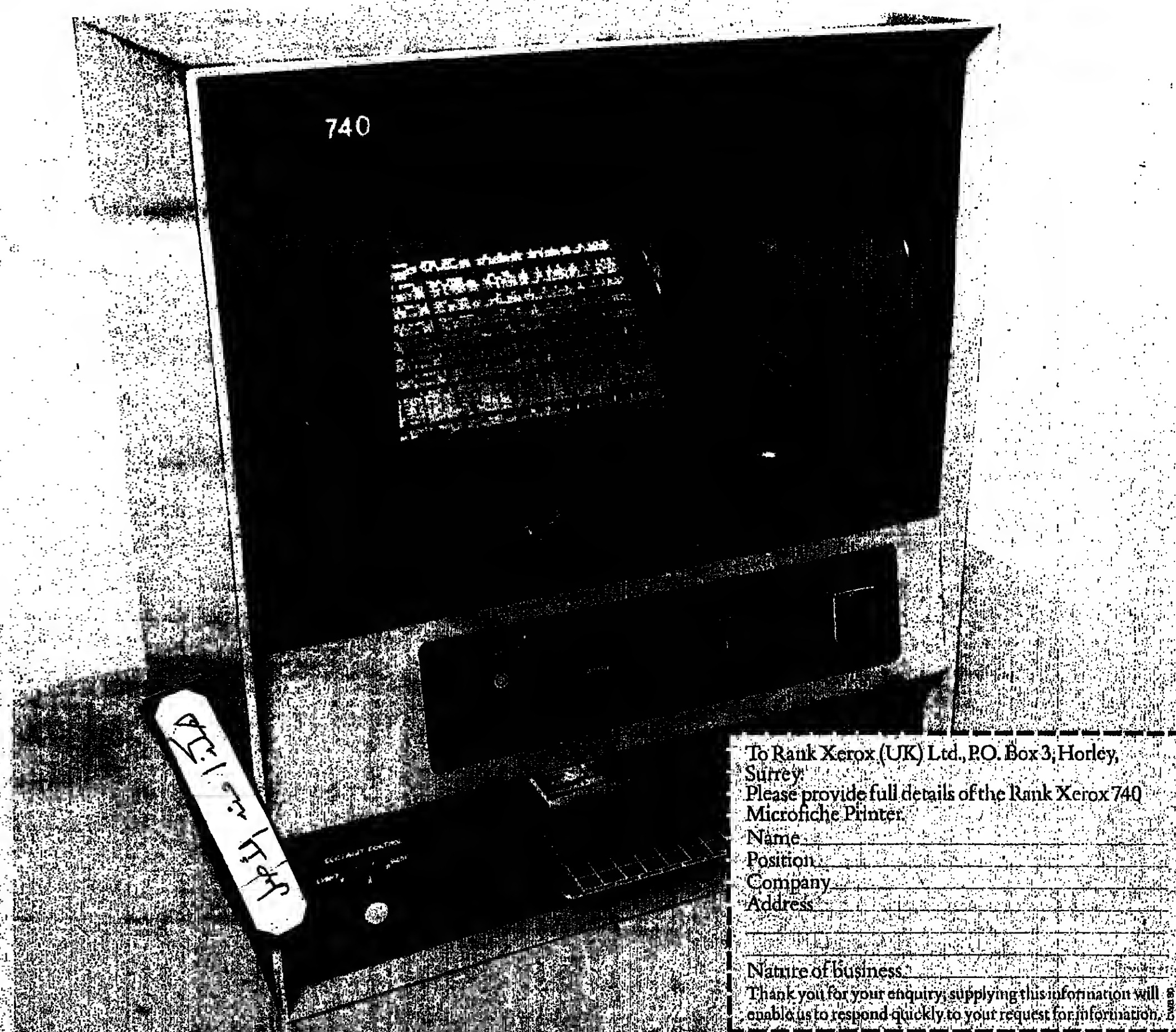
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## BOOKS

## Choosing your DP kit with care

Computer choice, by R. J. McQuaker, 177 pp. \$37.75. Elsevier North-Holland Inc, P.O. Box 211, Amsterdam, 1000AE, Holland.

There can have been few users so determined to get their choice of computer right as the Trustee Savings Bank Computer Services Ltd.

This book is dedicated to presenting a blow by blow account of the factors involved in the evaluation and subsequent replacement of its DP kit.

For most of us, choosing a computer isn't an exercise based on experience, judgment, plus technical evaluation.

Basic and practical selection criteria were not followed by the TSB. At each stage of evaluation, a full-scale dossier was produced, weightings compiled and components listed.

Little regard seems to have been given to suppliers. The exercise appears to have become

a massive case study which embraced an over- and under-view of every known, plus some newly-created, considerations.

Whether all this activity resulted in the best possible choice is not clear.

Time was obviously not a critical factor. Invitations to tender were sent out in mid-1978. The decision was made a year later with delivery scheduled yet another year later.

Unfortunately the book stops short at revealing who won the order. Instead, it branches off into a dissertation in respect of micros, minis and mainframes.

"Choosing a computer" can be enjoyed on two levels — one by other consultants in sea how it could be done; the other by the general reader to be taken as a warning of how not to let selection procedures get out of hand.

FOCUS

## Understanding 'computerese'

Data communications dictionary, by Charles Epp, 545 pp. £2.20 (paperback). Von Nostrand Reinhold Co Ltd (CW) Moly Millers Lane, Wokingham, Berks.

ONE of the curses of DP is the number of "computerese" words and acronyms which multiply as the industry expands. Some of these mean different things to different people, so the appearance of a dictionary for data communications terms will help to enlighten us a little.

Though aimed primarily at the data communications area, many of the terms in it apply to data processing in general. All the acronyms and terms are arranged in strict alphabetical order. This means, for example, that "I/O" follows "inverter". For quick reference, most of the acronyms appear again at the back of the book with short definitions.

The book does have a strong US flavour, but this is not so vital in DP and data communications in

particular. The author says that some of the terms were provided originally in publications emanating from the major US manufacturers. Other definitions have been agreed on at meetings of the ISO's technical committee 97/1.

Two surprising omissions from an otherwise very useful book are TP (teleprocessing) and UART (universal asynchronous receiver transmitter).

CHRIS YUETT

## Suitable for program students

Composite/structured design, by Glenford Myers, 174 pp. £12.90. Van Nostrand Reinhold Co Ltd (CW) Moly Millers Lane, Wokingham, Berks.

THIS is a textbook on methods of dividing large program logic into modules. The major subjects are on where to create dividing lines for this module, techniques for reducing the probability that change to a program will impact more than a minimum of modules and a broad perspective on modularisation techniques in relation to other design and programming technology.

The book is clearly suitable for students of programming. One does not have to take a position for or against the technology described. It is a large and interesting subset of the possible program logic structure techniques and any well trained programmer should be exposed to them.

Many experienced programmers might benefit from knowing that there is a teachable and formal approach to what they have intuitively practised — and even old foxes can pick up an insight or more here.

There is no good reason why new programmers should have to wait 10 years before picking up reasonable habits of modular design.

The text is quite readable and understandable and is well illustrated with examples, including realistic scenarios, and diagrams. The author returns to an earlier style in so much admired in him where he recognises the limited nature of his methods, the many difficulties of learning how to make good use of them as well as the many known and unknown side effects of the methods.

Myers shares all this with the reader, so that one side effect of the book is that it sets a pattern of openness and broadmindedness which other software technology textbooks would do well to emulate.

Because of my interest in higher level design methods, which are managed by clearly stated objectives, I was happy to see Myers' explicit recognition that such high level architecture methods driven by high level goals at least must precede composite design.

Adherents of "structuring programming" or any method for structuring the internal logic of a module will be happy to learn that composite design is a design phase intended to precede internal logic structuring.

Myers has made a sound start. I think we can build on that start by improving our understanding of the methods he documents, as well as our understanding of how to teach and implement the methods.

TOM GILL

## Forecasting brochure

Financial forecasting system brochure, EPS Consultants, 100-102, St. James, London, W1A 0AB. Tel: 01-435 8921.

BROCHURES giving details of the financial forecasting system, called EPS, are available from EPS Consultants. Applications, letters, inquiries, and orders, please send to:

network analysis, cash flow projection, acquisition and merger analysis, consolidation, currency conversion, risk analysis and more. The EPS package is available for IBM, Univac, Burroughs, Honeywell and ICL. It will be available in the near future. ROBERT STREET

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Classified Advertising: 15p per line per week. 10 lines or more: 12p per line per week. 20 lines or more: 10p per line per week. 30 lines or more: 8p per line per week. 40 lines or more: 6p per line per week. 50 lines or more: 5p per line per week. 60 lines or more: 4p per line per week. 70 lines or more: 3p per line per week. 80 lines or more: 2p per line per week. 90 lines or more: 1p per line per week. 100 lines or more: 1p per line per week. 110 lines or more: 1p per line per week. 120 lines or more: 1p per line per week. 130 lines or more: 1p per line per week. 140 lines or more: 1p per line per week. 150 lines or more: 1p per line per week. 160 lines or more: 1p per line per week. 170 lines or more: 1p per line per week. 180 lines or more: 1p per line per week. 190 lines or more: 1p per line per week. 200 lines or more: 1p per line per week. 210 lines or more: 1p per line per week. 220 lines or more: 1p per line per week. 230 lines or more: 1p per line per week. 240 lines or 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## OPERATORS

### BURROUGHS JNR OP C. £5,000

Operators with one year's MCP on medium Burroughs Systems would be ideal for this position. The company offers good working conditions and financial incentives.

### HONEYWELL OPERATOR £6,000

One year's good GCOS experience for this out of town site. Excellent promotion prospects.

### OEC/POP OPERATOR up to £5,000

Minimum of one year's experience within a PDP environment. There is a two shift system in operation and good progression into programming.

### OEC/PDP SUPERVISOR £5,500

At least one year's experience preferred. The client would consider any applicants with good supervisory and documentation experience for this days only position. Standard banking benefits apply.

### HONEYWELL OPERATOR £6,000

Any OS 2000 experience required for C. London site working a two shift system. New system to be installed later in the year.

### UNIVAC OPERATOR £6,500

C. London site urgently requires Univac Operator with 18 months' EXEC 8 experience. Excellent promotion and training prospects.

### DATA CONTROLLERS to £6,000

We have several positions for Data Controllers with a minimum of one year's experience on any hardware. Some of these vacancies offer subsidised mortgages.

This is just a small selection of current requirements. For details of these and others not advertised please contact MIKE WILSON on 01-242 8884 or SEAN OHLER on 01-242 1181 (24-hour Answerphone)

## PROGRAMMERS

### PROGRAMMER RPG II £6,000

+BANKING PERKS  
International Bank utilising IBM SYS 3 series machine currently require a programmer with approximately one year's RPG II experience. Preference will be given to applicants with IBM experience although this is not essential. As well as an excellent salary all usual Banking perks apply.

### PROGRAMMER COBOL to £9,000

A City-based financial installation, using an IBM 370 machine but shortly changing to 4331, require a Cobol programmer with a minimum of 18 months' experience, which must include sound knowledge of DOS and CICS. This is an excellent opportunity to join an expanding department and become involved in all aspects of systems and programming.

### CHIEF PROGRAMMER Neg. c. £8,000

+BONUS  
A Chief Programmer is required by a medium-size Burroughs installation based in C. London. A minimum of 4 years' Cobol programming including knowledge of Burroughs Medium Systems is essential. The successful applicant will be responsible for a team of 6 programmers and will enjoy a lively and friendly working environment. Benefits include an annual bonus, subsidised meals, B.U.P.A., etc.

### PROGRAMMER/ANALYST £6,500

+BANKING PERKS  
A Merchant Bank based in the City is currently seeking a programmer/analyst to complement their existing team. The minimum requirement is 18 months' Basic with some systems implementation. Obviously applicants who have worked in a Banking or Financial environment would be preferential, but enquiries are welcomed from applicants with a solid Commercial background. All standard Banking benefits apply including a subsidised mortgage.

## OPERATORS

### IBM OOS SHIFT LDR C. £7,000

Two shift working IBM 3031 site requires a shift leader with three years' experience including good knowledge of DOS JCL.

### IBM OOS SENIOR OP C. £6,500

City financial installation requires a senior operator with 2-3 years' sound DOS POWER experience for their 4300 series machines. Knowledge of CICS and VM would also be useful. 2 shift working only.

### IBM OOS OPERATOR £5,800

12-18 months' experience required by City based installation working an interesting 2 shift system, with taxi home when necessary.

### IBM OOS OPERATOR to £6,000

East London site is looking for DOS operators with upwards of 6 months' experience. Opportunity for good career progression and substantial overtime earnings.

### IBM OS OPERATOR C. £6,000

One years' plus OS or MVS experience for Central London financial installation running an IBM 3031.

### ICL GII/VMEB SENIOR OP C. £5,600

18 months' plus GII and VMEB experience required by 3 shift working London site. Good prospects. Salary currently under review.

### ICL GII OPERATOR £5,500

Large ICL installation using both 1900 and 2800 machines require operators with one year plus GII or VME experience. Opportunity to learn latest hardware and software.

### ICL ANY OPERATOR C. £5,000

Around one year's experience on any mainframe for large ICL installation based in Middlesex.

## SOUTH EAST MIDLANDS

### £8,200-£8,500 SENIOR ANALYST Herts EM794-

3 years' analysis experience. Development of systems from design to completion.

### £6,500-£8,500 SYSTEMS ANALYST Bedfordshire EM804

Minimum 6 months' analysis experience, preferably on ICL equipment. Manufacturing environment.

### £8,000-£8,750 PROGRAMMER Bedfordshire EM805

One year's experience. COBOL language, commercial applications. Preferably ICL background. Manufacturing environment.

### £N/A SYSTEMS ANALYST Cambs EM809

To develop new systems and enhance existing systems using minis and IBM mainframe. Knowledge of programming an advantage.

### To £9,000 SENIOR PROGRAMMER Peterborough EM808

5 years' IBM COBOL experience. Financial/business background. Some supervisory experience.

### £N/A PROGRAMMER Works EM800

2-3 years' commercial, financial or manufacturing programming experience, preferably COBOL language.

### £N/A ANALYST/PROGRAMMER Coventry EM796

Involved in the development of on-line database systems. 3 years' experience and knowledge of COBOL language. Manufacturing environment. Consultant: Margaret Brace.

## MIDLANDS & NORTH WEST

### £7,500 SENIOR PROGRAMMER West Bromwich 8802

COBOL and RPGII experience required for mainframe IBM installation. CICS and OLI advantageous, not essential.

### £6,000 APPLICATIONS PROG. Wolverhampton 8803

Intuitive and wide ranging applications, on-line, interactive systems development. COBOL essential. PLAN, Filelab useful.

### To £8,800 SENIOR ANALYST Stafford 8807

Excellent career opportunity, complete development of systems. 3 years' + systems experience with COBOL background.

### To £8,800 SYSTEMS ANALYST West Bromwich 8812

Suitable position for a COBOL programmer wishing to move into analysis, commercial applications background required.

### To £8,500 PROGRAMMERS Cheahire 8914

COBOL experience essential to work on a range of financial applications.

### To £8,500 COMPUTER PROFESSIONALS West Bromwich 8815

Experienced, mature candidates with understanding of COBOL, Business Systems Analysis, Project Control and Pre-Sales on ICL hardware. Consultant: Peter Bowen.

## BIRMINGHAM & HAMPSHIRE

### £8,000+ ANALYST Hampshire 5/811

Programming background useful. Basic +. Some analytical experience desirable. Financial applications.

### £6,700 PROGRAMMER Birmingham 5/812

Good educational background. ICL 1900 COBOL. Commercial applications in bureau environment.

### £8,000+ PROGRAMMERS City Centre 5/813

ICL COBOL to work with VME/B. Retaining given from 1800. Software House working mainly on production control applications.

### To £8,500 ANALYSTS Berkshire 5/815

Business Analysis background. Good educational background. Able to stand alone. Possible European travel.

### £6,500+ PROGRAMMER Bucks 5/818

1 year's experience using COBOL on commercial applications. Assembler experience would be useful.

### To £6,000 PROGRAMMERS Birmingham 5/817

12 months' experience of manufacturing applications. COBOL programming language. Honeywell hardware preferred but not essential. Retaining will be given. Consultant: Christine Pountney.

## SOUTH MIDLANDS & WEST COUNTRY

### C.£7,000 SENIOR ANALYST PROG. Avon W285

Preferably several years' ICL Programming experience. Varied work.

### £7,000+ SYSTEMS ANALYST Avon W286

Programming background required. ICL installation.

### C.£6,500 more for experience PROGRAMMERS Bristol W267

2 years' or more COBOL experience in IBM installation.

### Up to £8,000 PROGRAMMERS Cheltenham W288

2/3 years' COBOL experience, preferably some design experience. IBM, Bureau environment.

### Neg. up to £8,000 Ino. S/A OPERATORS Wores W288

At least 18 months' experience on IBM equipment. 3 shifts.

### Up to £7,500 SENIOR ANALYST West Country W281

3 years' experience as an analyst. IBM installation. Manufacturing/Commercial/Financial application.

### Up to £4,500 OPERATOR Bristol W282

Between 1-2 years' IBM experience. OOS/VS OS/VS. 3 shifts, 5-day week. Bureau environment. Consultant: Nigel Forster.

## NORTH EAST MIDLANDS

### £5,000-£5,000 PROGRAMMER Sheffield C402

Minimum 4 years' experience including 12 months On-Line Honeywell equipment. Manufacturing environment.

### £7,000-£8,000 SYSTEMS ANALYST Sheffield C403

4 years on Honeywell equipment. Working on interactive systems including material stock control.

### To £8K SYSTEMS ANALYST Leicester C404

At least 18 months in manufacturing environment. IBM equipment.

### To £8,600 ANALYST/PROGRAMMER Derby C435

2 to 3 years' experience of COBOL programming preferably on ICL hardware. Manufacturing environment.

### £7,500-£8,000 SYSTEMS ANALYST Leeds C406

2 years' experience of commercial or financial applications. ICL equipment.

### £6,000-£8,000 SENIOR PROGRAMMER Notts C423

3/5 years' COBOL programming. Capable of supervision. IBM equipment. Commercial environment.

### £6,000-£6,500 PROGRAMMER Derby C429

2/3 years' experience using IBM assembler language. Mainframe programming. Consultant: Roger Carr.

Interview any time - reverse charge calls accepted. Write Blackwood Associates, Freeport, Birmingham B2 1BA

## Blackwood Associates Recruitment Consultants

26 Waterloo Street, Birmingham B2 5TJ  
Telephone: 021-233 2921 (24 hr. service)

A Member of the OPS Group of Companies.

## Recruitment



## In Informatics

## IBM Programmers

France: to £15K + Benefits

A vast multinational organisation with offices throughout Europe and the USA has an urgent requirement for four Senior Programmers to work on their mid-range IBM 370 installation in an attractive area south of Paris. Suitable applicants should have developed and maintained an on-line, real-time system in preferably an IBM environment of particular interest with those who have written a data collection and interrogation system using CICS with DLI. However, those applicants with a broad spectrum of using any other IBM compatible IF monitor should not be deterred from applying as training will be given. Ref: L/24/B

## Systems & Programming Consultants

London: Salary to £13K

Our client, a leading International Programming and Systems House based in Central London, has an urgent requirement for project team specialists. Above-average salaries will be paid in recognition of the high level of expertise and commitment of suitable candidates who enjoy involvement with customers in developing their systems and solving their business problems. Successful candidates will probably be graduates with a minimum of two years programming experience on any commercial machine with a knowledge of both high-level and low-level languages will be a distinct advantage. If you have designed at least one complete on-line system or have had project management responsibility then you will be considered for a more senior position. Ref: L/24/B

## Pascal Compiler Development

Germany: Package to £17K

One of Europe's leading Systems and Software Houses has an urgent requirement for micro-computer software engineers to work on customer sites in W. Germany. Successful candidates will have participated in the development of a PASCAL compiler preferably for a 16 bit micro-computer. Familiarity with all phases of compilers (especially code-generation) is strongly desirable, but not mandatory. The company seeks career oriented professionals who have broad software interests. They offer generous relocation assistance, a comprehensive benefits package and six monthly merit reviews. English is the principal working language, thus knowledge of German is useful but not essential. Ref: L/24/C

## Cobol Programmers

Central London: Salary £6.5-8K

A renowned Software Products and Consultancy Group is seeking COBOL Applicants. Programmers to join a young and successful team working in Central London. Whilst our client has no preference for particular hardware experience, suitable candidates will most likely have current or very recent knowledge of IBM, DEC, ICL or HP equipment. Database and/or on-line skills will be especially welcome but those who can offer only high involvement should not be deterred from applying. This is an excellent career opportunity for young ambitious applicants to gain experience with a variety of hardware or indeed to move into totally new applications areas. Ref: L/24/D

## Operating Systems Specialists

Munich: Package to £18K

These positions represent outstanding opportunities for dedicated professionals who wish to relocate to West Germany. English is the principal working language but a knowledge of German is useful. Our client, a major software consultancy, requires operating systems specialists who are able to produce new O.S. environments, study their feasibility, review de-

## IBM Technical Consultants

London & Berkshire: £10K + Benefits

A major international supplier of Telecommunications and Database systems has linked LOGISTIX to identify and recruit several IBM oriented Technical and Systems Consultants for its UK headquarters. Candidates must offer other applications consultancy or systems engineering experience on IBM 370/903X hardware. Applications experience should preferably have been in manufacturing, production control, materials control or financial areas whilst systems exposure should have been with: CICS/VS, TOPAL, DBROM, MAPICS or IDMS. Online Database and TP monitor experience is mandatory for all positions. A feature of all these positions is the high degree of client contact in the form of seminars, product demonstrations and general technical liaison. Ref: L/24/E

## Telecomms/Project Leader

Paris: to £18K + Benefits

Due to the planned expansion of its distributed processing network a blue-chip multi-national requires a French-speaking Project Leader for its Paris-based installation. Candidates will be required to have at least 5 years' communication software experience and demonstrate the ability to lead a project team engaged in the development of non-homogeneous networks. The configuration will consist of several CIL minis on-line in a 370/108. The successful applicant, as well as having responsibility for the design and development of a full communications system, will also have the opportunity to assist in the evaluation and selection of the additional hardware and software required. Ref: L/24/F

Logistix, 10 Grenville Place London SW7 4RW

01-373 3082



Telex: 28800

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## HELP!

Overworked D.P.M. needs operations right-hand man

Salary package to £7,000

Location S.E. London

A hardworking computer operator with experience of small machines, is required to operate our client's ICL 2904 computer and run a small friendly department. Hours are a 35 hour week and are staggered between 08.00-20.30 as required.

Applicants should be loyal, self-motivated, able to solve run failures and faults, and have the ability to really assist the data processing manager. There is an excellent opportunity to learn COBOL, as programming duties could be combined with operations work.

INTERESTED? Then please contact Glenn Donnelly quoting ref. 792P

## THE UNIVERSITY OF LEEDS DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

### MICROSYSTEMS UNIT

Applicants are invited from disciplines with good honours degrees in a relevant subject, read some experience with microprocessors systems, for two posts of LECTURER in the above Department. One post will be mainly concerned with System Hardware and one with System Software.

The University has recently established a Microsystems Unit within the above Department to promote the understanding and use of micro-technology within the University. The successful candidates will be involved in the development of the facilities and activities of the Unit and in presenting courses at all levels within the University.

Salary on the scale of £10,000-£12,000 p.a. according to experience.

Application forms and further particulars may be obtained from The University, Leeds, LS2 9JT, quoting reference number, SE/42. Closing date for applications 11th July 1980.

(1704)

## UNIVERSITY OF LIVERPOOL

Computer Laboratory

### SYSTEMS ANALYST/PROGRAMMER

SALARY UP TO £6K

To join our thriving team working on microcomputing systems, you will be required to have a degree in a relevant subject and some experience with microprocessors systems.

Applicants should be able to solve run failures and faults, and have the ability to really assist the data processing manager. There is an excellent opportunity to learn COBOL, as programming duties could be combined with operations work.

INTERESTED? Then please contact Glenn Donnelly quoting ref. 792P

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# PDP PEOPLE

## INCREASE YOUR SALARY BY £1000

Our client, Logix Computer Services, is a Software House that specialises in the provision of expertise for real-time and complex software projects, with emphasis on POP and VAX hardware. Based in Berkshire, their operational area extends from Oxford to Portsmouth and from Wales to West London. If you are considering a career move they can genuinely offer progressive, challenging and satisfying work, excellent salaries, expenses, and a relaxed, informal but professional company attitude. Specifically at the moment they require:-

## PDP DEVICE DRIVER DESIGNER

Software engineer with PDP Device Driver design and development experience for leading role in Berkshire based PDP and VAX, MACRO, 11 and CORAL project.

## RTL 2 PROGRAMMERS

to work initially on a PDP 11, MTS. Real-time project in the Epsom area.

## SOFTWARE DESIGNERS

either with man-machine interface, user protocol, software experience, or with communications experience, preferably X.25 level 2, both for a Military Command and Control project in the Weybridge area.

## GEC 4000 SERIES

People at all levels from programmer to team leader.

## CORAL/ASSEMBLER PROGRAMMERS

For long term Naval Command and Control projects starting in September and based in either Berkshire or Portsmouth. This work may involve periods on the ship in harbour and at sea.

To discuss these permanent positions please telephone Mike Wilson at Crowthorne 77821 or 3370 (day) or Parkborough (Hants) 48083 (evening).

Computer & Management Personnel, 78 Little Britain, London, E.C.1

July 1980



## PROGRAMMERS

to £7,500 p.a.

The Central London Headquarters of a well established international software house network are inviting applications from programming professionals to fulfil their planned growth requirements.

They require a minimum two years + commercial D.P. experience as well as at least one year's knowledge of BASIC.

The positions are permanent and offer extremely good long-term career prospects within this fast-moving and progressive company.

The working environment is friendly, and as well as the above salary, there are excellent fringe benefits including an annual bonus scheme based on profits, twice yearly reviews and opportunities for overseas travel.

Meetings will be arranged in London within one week of application and offers will be made to successful candidates within two weeks of interview. Ref. 13/24/80.

(1332)

**HAVENINFORMATIX LIMITED**  
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## Dublin

Applied Management Systems Ltd. (AMS) is a young (1974) dynamic company operating as a computer consultancy and software house. The Business Systems Group within AMS specialises in the design and implementation of computer-based systems on IBM, GSD equipment.

Our In-house System/34 is used for program development and as a back-up machine for our large user base.

## Senior RPG II Programmer

A minimum of 2-3 years experience is essential, preferably with some experience of the IBM System/34.

You will have responsibility for the supervision and training of a small team of programmers.

We offer the usual benefits and an attractive salary package.

Why not meet us to discuss your career in further detail?

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**£7,500 to £10,000 + bonus**

### CHILSEA COLLEGE

University of London

THE COLLEGE'S COMPUTING CENTRE is located at Fulham Broadway, SW8 and operates Heath Interchange, multiple access computer under the VULCAN operating system, PDP11/40 and NOV machine. A College campus data communications network links these machines via a Dandelion PACS controller.

### OPERATIONS MANAGER

An experienced and mature systems-oriented manager is required to take charge of a small group of six operations and two day production staff, working with a minimum of 10 level staff. A full knowledge of modern time-sharing virtual memory operating systems is necessary.

### A SHIFT LEADER

It is required for two shift working in the College Computer Centre. A responsible and well-versed person in charge with a minimum of 10 level staff, with English or previous computer background. Two to three years' operating experience is necessary.

Salary scale: £5702-£8008 per annum (inclusive of overtime).

Further details and an application form can be obtained from the Personnel Officer, Chelsea College, Fulham Broadway, Chelsea, London, SW8 5TH. Closing date: 27th June, 1980.

CHILSEA COLLEGE

University of London

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## HOLLAND VIA I.A.

Industrial Artists has more challenging and rewarding staff positions on offer:

**ANALYST/PROGRAMMERS** with a good knowledge of COBOL are required, for a variety of commercial projects with particular emphasis on freight forwarding and general shipping systems. Hardware comprises IBM 370/168 Amdahl V7 and 3000 Series. Operating under OS/VS 1/2, DOS/VSE controlled by VM 370.

**SYSTEMS ENGINEERS** with communications software experience are required for group management positions within a large software development division. Experience of communications driver utilities, together with a good overall hardware/software appreciation. Preferred applicants will possess an accredited academic qualification in computer science, control engineering or similar subject.

**GRADUATES** with a minimum degree in computer science or similar subject who wish to join a software development team, with an International Computer Manufacturing Company, are invited to submit their curriculum vitae for consideration. An outline of source material studied will assist in our evaluations.

**COBOL PROGRAMMERS** to work on a major conversion project are required for immediate assignments. A variety of systems are currently being converted to run on IBM 4000 Series hardware, operating under DOS/VSE. Special conversion tools utilise IBM 370/168 hardware running under OS/VS1.

**COMPUTER OPERATORS** with experience of IBM-370 and 303X Series systems are required for various locations.

We would like to hear from **ANALYST/PROGRAMMERS** with direct experience of computer typesetting systems, applicants should also have a knowledge of DEC/PDP 11 hardware, operating under RSX 11/M.

**TECHNICAL AUTHOR**, basically electronics with some digital hardware and software knowledge essential. Experience of medical instrumentation advantageous but not mandatory.

Excellent salaries are on offer, including generous concessions already negotiated with the Dutch taxation authority, four weeks' paid holiday per annum, paid national holidays and certified sick-time, a holiday bonus, plus the full support of the administrative staffs based in our Dutch offices.

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This opportunity is SPECIAL because you will have the chance of learning sophisticated methods (including database and communications) on a large mainframe, using on-line program development techniques, and at the same time enjoy a good earnings package, with sound career prospects.

We are recruiting for clients, a well-organised London installation, and all the work is on-site. We would like to hear from programmers with at least 1 1/2 years' practical experience (for less senior positions), ideally including COBOL. Team leadership ability will be required for more senior candidates.

Please ring us in confidence for a talk, quoting ref. 238CW or leave a message on our answering machine after hours and we will contact you.

(1231)



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### SYSTEMS PROGRAMMER

Ideally the successful applicant will have had previous experience in systems programming and preferably IBM Mainframes. High end Interactive Communications and Interfacing Plug Compatible Manufactured Products with I.B.M. equipment. Responsibilities will include:—  
Definition of Customer requirements, preparation of proposed systems Generation, Installation and Debugging, Customer Software Support and Operator Training.

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This post requires a person with experience of Data Communication Networks, defining systems both as user-end and in a sales environment. Large proposal preparation and presentation to customers.  
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### TRAINEE SYSTEMS ENGINEERS

The Company would be interested to hear from Graduates and Engineers who have had experience in the Data Communication and Computer Peripheral industry and would be interested in establishing a career in data communication system engineering.  
An attractive salary package will be offered with the additional benefit of a Company car.  
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Eg: life assurance and Income Contingence Plan, non-contributory pension scheme, Trade Union P.A. Membership, 4 weeks annual holiday, some assistance can be given with relocation expenses.  
If you would like to apply for one of the above positions please write or telephone in the first instance for an application form to Miss S. J. Sewerlin, Personnel.

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## JBA

### Database Consultants

**Germany to DM 100,000 p.a.**  
An extremely well known consultancy organisation, primarily concerned with Database assignment, has a number of opportunities in Germany for experienced and able Database specialists. In-depth knowledge of IMS, Data Analysts etc is absolutely essential and knowledge of German would certainly be a great help. Full relocation and substantial fringe benefits are available, plus the chance to return to the U.K. within the Company at a later stage. **Contact: Andy Wright**

### Training Manager

**London based to £15,000 +**  
A highly motivated, senior training specialist is required to establish and run a new training group within a highly regarded, specialist consultancy. The Company already runs a number of courses for clients and others, but now feels that there is scope for a new business unit to be developed and properly organised. The appointee is likely to have a sound technical d.p. background and be familiar with database, t.p. and data analysts techniques. Excellent fringe benefits can be expected and a potentially highly lucrative profit share scheme is operated. **Contact: Andy Wright**

### Systems Advisers/Sales Support

**North London £9,500 + car**

A reputable and growing manufacturer in the forefront of the mini computer field requires customer support analysts/programmers. Candidates for these positions will be energetic, versatile and capable of controlling several client accounts at any one time. Responsibilities will encompass pre/post sales support, customer training, conducting demonstrations and benchmark software. The experience required is a thorough understanding of data processing techniques gained through previous successful support of commercial applications. Fringe benefits include a bonus scheme, BUPA and a car. **Contact: Margaret Stevens**

### COBOL Programmers

**N.W.1 to £8,000**  
One of the recognised market leaders in the retail industry is currently wishing to reinforce its programming teams at all levels. Applicants with experience of IBM 370 and 3031 mainframes under DOS/VS and with at least two years' Cobol in a commercial environment are required. More senior candidates will be expected to possess database knowledge with experience of DLI and involvement with systems analysis would be a distinct advantage. First class benefits package. **Contact: Brian Postles**

### Analyst/Programmer

**London up to £8,000**  
A large international commercial company wishes to recruit an Analyst/Programmer to work on the development of several sophisticated real-time projects. Candidates should have at least three years experience in programming and design of commercial applications. Knowledge of communications, database or real-time would be an advantage. Excellent career opportunity. **Contact: Jim Baker**

### Analyst/Programmer

**Croydon c. £8,000**  
Our client, a large organisation, has immediate vacancies for Analyst/Programmers to join the commercial development teams. Applicants should have at least three years ANS COBOL programming experience on IBM equipment and have had some involvement with systems design, preferably in accounting, general commercial or database applications. This is an exciting opportunity to work on new IBM hardware with above average fringe benefits. **Contact: Jim Baker**

### Programmer (RPGII)

**Peterborough c. £8,000**  
A world leader in the manufacture of school and office Data Processing supplies are seeking an experienced programmer to work in its state of the art computer department. Ideally, 2 years good commercial programming experience of RPGII, while a knowledge of IBM S32, S34 and MAAP/CS would be a definite advantage. Applications covered include all manufacturing systems and customer service to be used in many European countries. Excellent prospects will be offered to the successful candidate, who could expect to reach a supervisory position in the immediate future. **Contact: Janet Chilvers**

**JAMES BAKER ASSOCIATES,**  
International Personnel Consultants,  
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Tel: 01-489 5311



## Northern Computer Opportunity

### Analyst/Programmer

c.£8,500 West Lancashire

Are you ready to run your own installation?

Our client is part of an American group with a \$3.1 billion turnover and a work force of 88,000 employees world wide. In the West Lancashire subsidiary, they are currently installing a Data 100, Sycor 445, linked to the States and are seeking an Analyst/Programmer preferably with Manufacturing systems experience.

Being the only data processing experienced employee, you must be aware of the implications of introducing data processing into a company and have experience of liaising with non-dp experienced personnel. You will have to be a self motivated individual and training will be given where necessary, including a trip to the parent company's data centre in Pennsylvania.

For further information on this rare opportunity telephone the number below quoting the reference JC/21.



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## Systems Engineer Systems maintenance in an innovative environment

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The maintenance of operational efficiency - carried out by engineering teams - is a priority. Reporting to the Senior Systems Engineer, you'll be monitoring the performance of DP and graphic equipment and associated facilities, correcting faults where necessary. There is a strong emphasis in the

Department on advanced development work; you will also be directly involved in modifications to hardware and alterations to computer suites and terminals.

Qualifications to HND level or equivalent are essential. You should also have at least two years' digital experience, and an electromechanical background.

A competitive salary is offered, together with a full range of company benefits, which includes contributory pension scheme with free life assurance.

For further details and an application form, please contact, quoting Ref RWE/CW:

Senior Personnel Officer  
(Exploration)  
The British National Oil Corporation  
150 St. Vincent Street  
GLASGOW G2 5LJ  
Tel: 041-228 5555



The British National Oil Corporation

### BOX Nos.

Box number replies should be addressed to:

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Weekly  
Dorset House  
Stamford Street  
London SE1 9LU

LONDON BOROUGH OF SUTTON,  
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Application forms and further particulars are available from the Principal of the College to whom completed forms should be returned within 14 days of the appearance of this advertisement.

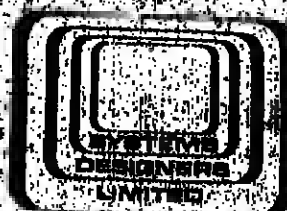
04/86

## Real-time languages Language environments Program development tools Compiler design and development

The Advanced Software Division of Systems Designers Limited needs experienced people to join research and product development teams working on real-time languages, products developed within the division include the Portable CORAL 88 Compiler and the CONTEXT Microprocessor Development System. The range of these products is being extended to include the new 32-bit VME architecture and multi-processor systems.

Many of the Division's current projects will have a significant impact on software technology over the next few years. Such projects include a new real-time program development system, an active research interest in embedded multi-processor systems and the design and implementation of Ada compilers and programming tools.

If you have a good scientific background, relevant project experience, and are keen to the challenge, we would like to hear from you.



For an application form and Company brochure, telephone Sue Wicks or for further information write to:  
SU Wicks, Operations Director  
Systems Designers Limited  
Cambridge Science Park  
400 Westley, Cambridge CB3 0ET  
To telephone, use the operator for 04540 3134

## CONSULTANTS SOFTWARE ENGINEERS PROGRAMMERS Salaries to £11,500 with usual benefits

Systems Designers Limited is a British computer systems consultancy specialising in mini and micro-based systems for the highly demanding Defence and Industrial real-time fields, and also exciting new developments such as robotics. In 1985 the company has grown to 220 professional staff while retaining its independence and individual management style.

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## FERRANTI Computer Systems



## SOUTH WALES

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AND TEAM AND PROJECT LEADERS  
STARTING SALARIES to £9K + BONUS

Our client, Ferranti Computer Systems Ltd., has gained a considerable and worldwide reputation in the field of computer systems founded upon their ability to assume overall responsibility for all aspects of the design, manufacture, programming and implementation of the systems they supply.

At their Cwmbran Department, which is the most rapidly expanding part of the Bracknell Division, they are responsible for the design and development of real-time computer based systems used for Air Defence, Air-Traffic Control Systems, Avionics and Army Applications.

They now require further experienced engineers and programmers to work at Cwmbran and Newport.

Of special interest would be:

- ★ GRADUATES in a scientific or numerical discipline
- ★ ENGINEERS with experience of LSI Circuit, ATE or Logic Design
- ★ SYSTEMS AND APPLICATIONS DESIGNERS with CAD, Micro or Mini, real-time systems, or any scientific or commercial programming experience

If you are in any of the above categories, and wish to embark upon, or move into a new career, please phone Digby Dyke on 021-643 8501, or write to the address below, quoting reference number DB/261-12/08

Excellent benefits and generous relocation assistance are offered in all these appointments.

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### Computer Managers

Berkshire based c. £15,000 package

An international services organisation wishes to appoint senior d.p. professionals to take responsibility for their Facilities Management projects throughout the U.K. and Europe. This means taking total responsibility for large mainframe installations to achieve efficient and effective production units. Candidates should have several years in a d.p. management position, either in Operations, Development or Services, with the capacity and enthusiasm to undertake challenging projects. Ability to communicate at all levels, particularly with senior management, is essential. Large company benefits including high basic salary and bonus.

Contact: Jim Baker

### Programming Project Leaders

Gloucestershire to £9,000 + reloc. etc.

One of the most technically innovative manufacturing companies in the U.K. is seeking like-minded **PROGRAMMING PROJECT LEADERS** to head their teams in setting up a brand new HP3000 installation and develop database and T.P. oriented systems.

At this level some knowledge of Database, e.g. TOTAL or IMAGE and on-line systems is essential as is COBOL programming experience, with at least one years technical design but specific hardware knowledge is not required. Candidates must be able to show good managerial qualities and an ability to interact with all technical staff.

A relocation package is available for those wishing to move to this beautiful part of the country, plus all normal large company benefits.

Contact: Brian Postles

### Senior Systems Positions

£7,500-£9,500 + reloc. etc.

For the same installation as above, our client wishes to make two additional systems appointments, **SYSTEMS PROJECT LEADER** and a **SENIOR SYSTEMS ANALYST**.

The systems to be developed and designed initially are in the financial and manufacturing areas and will naturally incorporate Database and on-line techniques. Previous experience should cover similar application areas and candidates are expected to have seen at least one project through to implementation. As with the above positions, excellent corporate benefits apply.

Contact: Brian Postles

### Technical Publications Manager

Rural Beds. to £10,000 + reloc.

A major computer manufacturing Company has established a technical publication group in Bedfordshire which is rapidly expanding in size, necessitating local management.

Candidates must be fully experienced, Senior Technical Authors with a solid background in the computer industry and a strong systems and software bias. The ability to manage staff, to edit and expedite projects, assess products and recruit staff will be the essential criteria of the appointee. Contact: Andy Wright

### Systems Analysts

Close to Victoria Station £8,000 - £10,000

+ bonus + profit share

A well established international service organisation currently has vacancies for Systems Analysts to assist with the development of commercial applications. Candidates should have 5 years in systems design and implementation, preferably with a COBOL programming background. Knowledge of on-line and database techniques would be an advantage. This is a real opportunity to work on a variety of projects with excellent career prospects. Contact: Margaret Stevens

### Systems Programmer

Essex & European Travel £9,500

A large well known organisation operating on an international basis require additional expertise in their systems support area. The company have a 370/156 and Amdahl V6 using OS/MFT (converting to MVS) with IMS and TP system.

Candidates must have relevant computing experience with at least 2-3 years systems programming on a large OS type system. The activity of maintenance and trouble-shooting will provide plenty of interesting work that could involve trips to Germany and Spain.

Contact: Janet Chilvers

JAMES BAKER ASSOCIATES,  
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(1818)

## Why our Data Processing Unit is in such demand

We've a problem we're proud of. Because we are a progressive organisation the people who work with us demand the use of the most up-to-date facilities. They are eager to use advanced technologies and new systems but sometimes, despite our size, that can put a strain on our resources. For instance, our various U.K. locations are demanding more from our Data Processing Unit and we need a first class:

### DATA PROCESSING MANAGER

We want to meet a man or woman who can really make the optimum use of our facilities so that all our users can be satisfied: someone who can take control of all the data processing requirements within our group.

Our current hardware consists of a Honeywell Level 64 and two Ventek mini-computing systems. This installation provides an on-line data entry facility to a number of sites and utilises an extensive data base.

The unit has been functioning for over ten years and has a staff of 20. Now it is developing rapidly, in such a way as to provide a real challenge and considerable scope for the right applicant.

If you have experience within a similar environment and can demonstrate both technical and managerial skills, we would like to hear from you.

You'll find the rewards are excellent, with a realistic salary, a company car and a comprehensive range of large company benefits, including, if appropriate, a first class relocation package to bring you to the West Midlands where some of Britain's finest countryside can be found and where you will work in offices only one mile from the M6.

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and Location: Mth/Year Mth/Year Duties and experience \_\_\_\_\_

Signature \_\_\_\_\_

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### ANALYST DA to £10,000 NW LONDON

The Computer and Software Services Department of a young and expanding company is currently involved in introducing major extensions to existing on-line systems covering Stock Control, Finance and Management Information applications. Their in-house computer system currently comprises a PDP 11/70 configuration and it is planned to install identical satellite systems in Northern Europe and the USA.

Ideally candidates should come from a commercial programming background and be familiar with on-line computer systems.

Based in modern, spacious head-offices, this position also offers an excellent benefits package.

Contact Barbara Ell quoting BL/11213.

### SYSTEMS ANALYSTS AND SENIOR SYSTEMS ANALYSTS CITY £9.5K PLUS

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They are looking for Analysts with a good understanding of business processes and commercial awareness who will probably have supervisory experience.

Essential requirements are strong communication skills, in-depth experience of ascertaining users requirements and a technical background to support effective design of systems.

Contact Robin Lacey quoting RL/10174.

### PROGRAMMER CENTRAL LONDON £9,000

Our client, a multi-product, worldwide industrial group, will TRAIN you in the programming and analysis disciplines required to develop integrated real-time accounting and manufacturing systems, on the mini-computer network currently being installed.

These rare opportunities are open to candidates with 2 years' commercial programming experience who are able to quickly benefit from the training given and ultimately to play an ever increasing role in the development and expansion plans for this highly successful company.

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### GRADUATE PROGRAMMERS - BECOME AN ANALYST NORTH LONDON TO £8K + OCTOBER REVIEW

Our client is prepared to train programmers in analysis.

If you have two years commercial COBOL experience and have been educated to degree level you could join an expanding applications team. Extensive on-line development is underway in both the commercial and manufacturing areas.

Training and career opportunities will be provided by the professional organisation.

Contact Caroline Bagley quoting CB/6839.

### COBOL PROGRAMMERS BRENTFORD c. £7,000

A leading engineering company based in Brentford, Middlesex, is currently seeking two COBOL programmers.

It is envisaged that the applicants will have 2-3 years experience of COBOL, gained in a commercial environment. Imminent projects include on-line order processing and an inventory management system.

Excellent career prospects await for the successful candidates with on-going formal training being provided where necessary.

Contact Peter Kenneswell quoting PK/11370.

### SYSTEMS ANALYSTS £10,000 VICTORIA, LONDON OIL COMPANY

If you are a Systems Analyst with at least 3 years solid systems experience, you would be involved in the implementation and development plans for the 1980's. This will incorporate projects for UK Marketing, Finance and Administration business operations of which many will necessitate real-time facilities on their twin IBM 3031's using IMS DB/DC Database techniques.

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### SENIOR SYSTEMS PROGRAMMER WEST OF LONDON c. £9,000 + REVIEW IN SEPTEMBER

A major group of industrial companies, based West of London, wishes to recruit a Senior Systems Programmer.

A medium sized IBM 370 currently supports a large RJE/on-line network.

Applicants for this position are required to have 2 years' experience as a systems programmer working with IBM 370 hardware coupled with a sound knowledge of Assembler.

The systems team consists of four technicians who are responsible for all systems programming functions within the group.

This represents an excellent opportunity to advance your career and experience into many different areas of computing with formal training being provided.

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### PROGRAMMING PROJECT LEADER EAST LONDON To £11.5K

One of the largest bureaux in the U.K. require a project leader to lead, supervise and motivate a team of programmers engaged in development of new, and maintenance of existing systems.

Applicants should have a solid COBOL background displaying technical ability and supervisory experience.

The position offers an ideal opportunity to develop your management skills and career in a technically innovative environment.

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**£10K SYSTEMS ENGINEER** **London**  
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Minimum of 4 yrs. programming necessary with experience of IBM 370 and DOS/VS, COBOL plus one other language required.

**£7700-9300 SNR. SYSTEMS ANALYST** **Survey**  
On-line systems with manufacturing industry D.P. experience required. IBM experience preferable, particularly with small machines. Should be willing to work in variety of locations throughout UK.

**£7800 SYSTEMS ANALYST** **Middx**  
2 yrs. experience necessary, preferably with accounting systems. Applications are industrial, financial and commercial. Hardware is IBM/370.

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 appropriate references including the  
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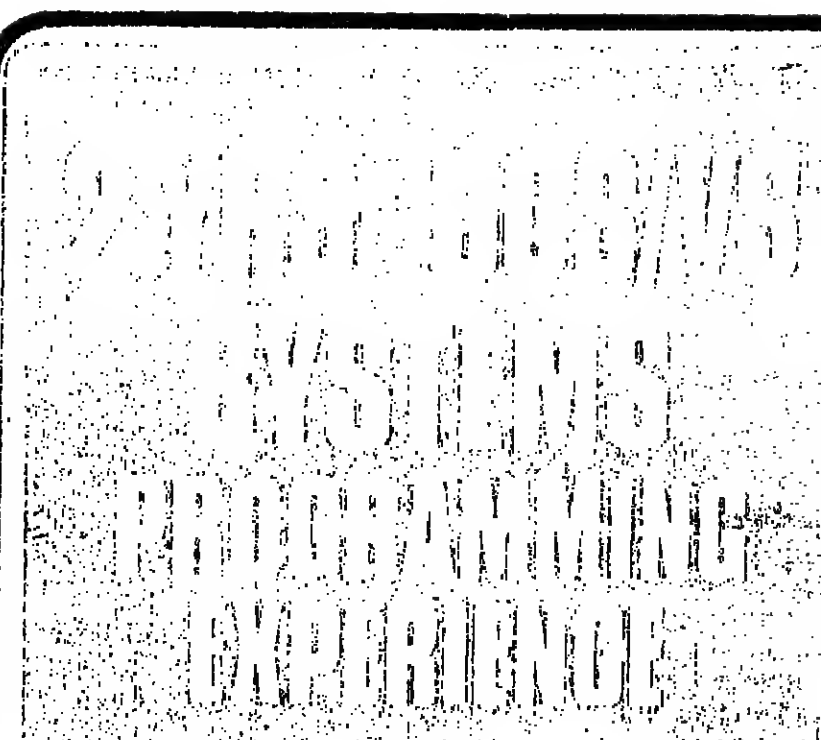
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**Computer People Midlands**

VU Group

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Ref: SW3/1206/CW

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Ref: SW2/1206/CW

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Either way if you have a lively mind and the ability to write we would like to hear from you.

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Applications in confidence with cv's or requests for further details and application forms, to Dr. J. A. G. Thomas, Publishing Director, IPC Electrical-Electronic Press, Room 210, Dorset House, Stamford Street, London, SE1 8LU. Telephone 01-261 8400.

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• Experience of maintaining and developing operational multi-processor systems would be an advantage. We would particularly welcome applications from graduates who want to work on advanced computer systems and their applications in a stimulating and challenging scientific environment.  
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For an application form contact Nicky Watts.

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Tel. 0235 42886 or 0235 42850.  
Please quote reference CWP/84/84.

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Programming these systems is a challenging task and our programmers have to be given the finest possible training. We now require, within our Airborne Software Division, a Software Lecturer to join a small team responsible for providing new courses in programming and computer techniques particularly, but not exclusively, in the area of microprocessors. This will involve every stage from writing the syllabus to preparing and delivering the lectures. The students will consist of small groups including programmers, engineers and others, many of whom may be new to programming.

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**Location** - Farnborough, Hampshire.

**Application** - Send your CV to: The Personnel Department, Farnborough Research and Development, Farnborough, Hampshire.

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**Salary** - £5,000 to £7,000 per annum, depending on experience.

**Location** - Leeds University, Leeds.

**Application** - Send your CV to: The Director of Staff, Leeds University, Leeds.

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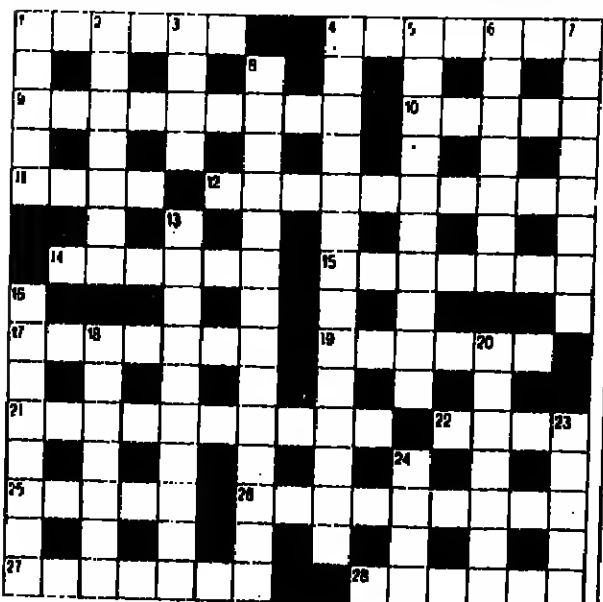




# CW Prize Crossword No 5

Compiled by Alec Robins

A PRIZE OF £10 will be awarded for the first correct entry. The second and third correct solutions opened will receive £5 each. Entries to Crossword Competition, Computer Weekly, Dorset House, Stamford Street, London SE1 1LU, by first post Friday, June 20. Please use a ballpoint pen to complete the crossword.



Name ..... (Miss, Mrs, Ms, Mr)

Address .....

Telephone .....

I accept the rules and conditions of the Computer Weekly Crossword Competition.

Signed ..... Date .....

ACROSS

1. Child came across, drinking fizzy pop (6)
4. A profligate - used to be Lieutenant protecting the Queen in retreat (7)
9. Shut up about everyone's narrow escape (5,4)
10. What Clementine wore at home inside a shrunken cape (5)
11. Thrued carried by the shuttle must be stirring in the rain (4)
12. Drump, forsaking, we hear, aggressive puritism (4,6)
14. Feisty, n. pickpocket, in charge (8)
16. Where one may see sisters getting ahead (7)
17. Desk clerk nearly ten? That's surprising (7)
19. Self-interest, for example, in order (6)
21. 22. Run short unfortunately when get to make an announcement (4,3,4)
25. King comes in drawn and exhausted (5)
26. Job falling to supply capital, housemaid perils is taking notice (9)
27. More than one puzzle unravels, tripping the theologist (7)
28. It's almost foolish, keeping an old convict in jail (6)

Down

1. Parrot's bill plunged into animal's stomach (5)
2. Piano covered on top and made impervious to winter (7)
3. Garden within fenced enclosure (4)
4. What makes sage choose a fruitless quest (4,5,5)
5. Material suitable for a shoe-tree? (10)
6. He lives on investments, finding an opening that is right (7)
7. Endure garrulous talk before beginning to produce dying breath (4,4)
8. Out in China all's camouflaged, causing illusions (14)
13. Her lips do a curve, becoming roundish (10)
16. The rascal gets second-class on the large boat (8)
18. The block, n. Communist, is screened (7)
20. The girl with n. hair-style business (7)
23. Indicates rising urge, in attack (3,2)
24. Head withdraws from ethical examination (4)

Winners and solution: Prize Crossword

WINNER of Computer Weekly Prize Crossword No 5 is Michael Beeson, a computer systems house based in London, which specialises in CAI and ETL. Second prize was won by John Fitzsimon, a systems house based in London, which specialises in CAI and ETL. Third prize was won by John Fitzsimon, a systems house based in London, which specialises in CAI and ETL.

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